



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

## Workshop Manual

Audi A6 2011 ➤

Audi A6 China 2012 ➤

Audi A7 Sportback 2011 ➤

6-cylinder direct injection engine with supercharger  
(3.0 ltr. 4-valve TFSI, EA837evo)

Engine ID	CRE C	CRE D	CTD A	CTD B	CRE H				
-----------	----------	----------	----------	----------	----------	--	--	--	--

Edition 05.2018

## List of Workshop Manual Repair Groups

### Repair Group

- 00 - Technical data
- 10 - Removing and installing engine
- 13 - Crankshaft group
- 15 - Cylinder head, valve gear
- 17 - Lubrication
- 19 - Cooling
- 21 - Turbocharging/supercharging
- 24 - Mixture preparation - injection
- 26 - Exhaust system
- 28 - Ignition system

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

## Contents

<b>00 - Technical data</b>	<b>1</b>
1 Identification	1
1.1 Engine number/engine data	1
2 Safety precautions	2
2.1 Safety precautions when working on the fuel supply system	2
2.2 Safety precautions when working on vehicles with start/stop system	2
2.3 Safety precautions when using testers and measuring instruments during a road test	3
2.4 Safety precautions when working on the cooling system	3
2.5 Safety precautions when working on the ignition system	3
2.6 Safety precautions when working on the subframe	4
2.7 Safety precautions when working on the exhaust system	4
3 Repair instructions	5
3.1 Rules for cleanliness	5
3.2 Foreign particles in engine	5
3.3 Contact corrosion	5
3.4 Routing and attachment of pipes, hoses and wiring	6
3.5 Installing radiators and condensers	6
<b>10 - Removing and installing engine</b>	<b>7</b>
1 Removing and installing engine	7
1.1 Removing engine	7
1.2 Separating engine and gearbox	22
1.3 Securing engine to engine and gearbox support	28
1.4 Installing engine	31
2 Assembly mountings	37
2.1 Exploded view - assembly mountings	37
2.2 Supporting engine in installation position	39
2.3 Removing and installing engine mountings	40
2.4 Removing and installing gearbox mounting	42
3 Engine cover panel	43
3.1 Removing and installing engine cover panel	43
<b>13 - Crankshaft group</b>	<b>44</b>
1 Cylinder block (pulley end)	44
1.1 Exploded view - poly V-belt drive	44
1.2 Removing and installing poly V-belt	47
1.3 Removing and installing tensioner for poly V-belt	51
1.4 Removing and installing vibration damper	53
1.5 Removing and installing sealing flange (pulley end)	53
2 Cylinder block (gearbox end)	57
2.1 Exploded view - cylinder block (gearbox end)	57
2.2 Removing and installing drive plate	57
2.3 Renewing crankshaft oil seal (gearbox end)	58
3 Crankshaft	61
3.1 Exploded view - crankshaft	61
3.2 Crankshaft dimensions	65
3.3 Measuring axial clearance of crankshaft	65
3.4 Measuring radial clearance of crankshaft	65
3.5 Removing and installing sender wheel	66
3.6 Checking sender wheel	67
4 Balance shaft	69
4.1 Exploded view - balance shaft	69



4.2	Removing and installing balance shaft	69
5	Pistons and conrods	72
5.1	Exploded view - pistons and conrods	72
5.2	Removing and installing pistons	74
5.3	Checking pistons and cylinder bores	75
5.4	Checking radial clearance of conrod bearings	76
<b>15</b>	<b>Cylinder head, valve gear</b>	<b>77</b>
1	Timing chain cover	77
1.1	Exploded view - timing chain cover	77
1.2	Removing and installing timing chain cover	80
2	Chain drive	93
2.1	Exploded view - camshaft timing chains	93
2.2	Exploded view - drive chain for valve gear	96
2.3	Exploded view - drive chain for oil pump	98
2.4	Removing camshaft timing chain from camshafts	98
2.5	Removing and installing camshaft timing chain	108
2.6	Removing and installing drive chain for valve gear	111
2.7	Removing and installing drive chain for oil pump	113
3	Cylinder head	115
3.1	Exploded view - cylinder head	115
3.2	Removing and installing cylinder head	117
3.3	Removing and installing cylinder head cover	124
3.4	Checking compression	126
4	Valve gear	129
4.1	Exploded view - valve gear	129
4.2	Measuring axial clearance of camshaft	132
4.3	Measuring radial clearance of camshaft	133
4.4	Removing and installing camshaft	134
4.5	Removing and installing camshaft control valves	141
4.6	Checking hydraulic compensation elements	142
4.7	Removing and installing valve stem oil seals	144
5	Inlet and exhaust valves	153
5.1	Checking valve guides	153
5.2	Checking valves	154
5.3	Valve dimensions	154
<b>17</b>	<b>Lubrication</b>	<b>155</b>
1	Sump/oil pump	155
1.1	Exploded view - sump/oil pump	155
1.2	Engine oil	158
1.3	Removing and installing sump (bottom section)	158
1.4	Removing and installing sump (top section)	160
1.5	Removing and installing oil pump	163
1.6	Removing and installing oil level and oil temperature sender G266	164
2	Engine oil cooler	165
2.1	Exploded view - engine oil cooler	165
2.2	Removing and installing engine oil cooler	165
3	Crankcase breather	167
3.1	Exploded view - crankcase breather system	167
3.2	Removing and installing oil separator	168
3.3	Removing and installing hose for crankcase breather system	169
3.4	Removing and installing crankcase breather shut-off valve N548	170
4	Oil filter/oil pressure switches	172

4.1	Exploded view - oil filter	172
4.2	Exploded view - oil pressure switches/oil pressure control	173
4.3	Removing and installing oil pressure switch F22	173
4.4	Removing and installing oil pressure switch for reduced oil pressure F378	174
4.5	Checking oil pressure	175
4.6	Removing and installing valve for oil pressure control N428	176
<b>19</b>	<b>Cooling</b>	<b>178</b>
1	Cooling system/coolant	178
1.1	Connection diagram - coolant hoses	178
1.2	Checking cooling system for leaks	182
1.3	Draining and filling cooling system	183
2	Coolant pump/thermostat assembly	191
2.1	Exploded view - coolant pump/thermostat	191
2.2	Exploded view - electric coolant pump	194
2.3	Exploded view - coolant temperature senders	195
2.4	Removing and installing electric coolant pump	195
2.5	Removing and installing coolant pump	198
2.6	Removing and installing thermostat	200
2.7	Removing and installing coolant temperature sender G62	201
2.8	Removing and installing temperature sender for engine temperature regulation G694	202
2.9	Removing and installing coolant valves	203
3	Coolant pipes	205
3.1	Exploded view - coolant pipes	205
3.2	Removing and installing coolant pipes	208
4	Radiators/radiator fans	222
4.1	Exploded view - radiators/radiator fans	222
4.2	Exploded view - auxiliary radiator	225
4.3	Removing and installing radiator	225
4.4	Removing and installing water radiator for charge air cooling circuit	230
4.5	Removing and installing radiator cowl	234
4.6	Removing and installing radiator fan V7	236
4.7	Removing and installing auxiliary radiator	236
<b>21</b>	<b>Turbocharging/supercharging</b>	<b>239</b>
1	Supercharger	239
1.1	Exploded view - supercharger	239
1.2	Exploded view - magnetic clutch	242
1.3	Exploded view - rotor assembly	243
1.4	Removing and installing supercharger	244
1.5	Checking supercharger for leaks	250
1.6	Removing and installing magnetic clutch	252
1.7	Removing and installing pulley for supercharger	259
1.8	Removing and installing drive unit	260
1.9	Removing and installing rotor assembly	263
1.10	Renewing drive shaft oil seal	267
1.11	Securing supercharger to engine and gearbox support	269
1.12	Removing and installing sender 1 for turbocharger speed G688	272
2	Charge air system	274
2.1	Exploded view - charge air system	274
2.2	Exploded view - hose connections for charge air system	275
2.3	Removing and installing charge air cooler	275
2.4	Removing and installing charge pressure sender G31 / G447	280
<b>24</b>	<b>Mixture preparation - injection</b>	<b>281</b>



1	Injection system	281
1.1	Overview of fitting locations - injection system	281
1.2	Checking fuel system for leaks	288
2	Vacuum system	289
2.1	Connection diagram - vacuum system	289
2.2	Checking vacuum system	290
3	Air cleaner	292
3.1	Exploded view - air cleaner housing	292
3.2	Removing and installing air cleaner housing	292
4	Intake manifold	295
4.1	Exploded view - intake manifold (bottom section) with fuel rail	295
4.2	Removing and installing intake manifold (bottom section) with fuel rail	297
4.3	Removing and installing throttle valve module J338	301
4.4	Removing and installing regulating flap control unit J808	303
4.5	Removing and installing fuel line	303
5	Injectors	305
5.1	Exploded view - fuel rail with injectors	305
5.2	Removing and installing fuel rail	308
5.3	Removing and installing injectors	310
5.4	Cleaning FSI injectors - vehicles with FSI engine	316
6	Senders and sensors	318
6.1	Removing and installing intake air temperature sender G42 / intake manifold pressure sender G71	318
6.2	Removing and installing fuel pressure sender G247	318
6.3	Removing and installing fuel pressure sender for low pressure G410	319
7	High-pressure pump	321
7.1	Exploded view - high-pressure pump	321
7.2	Removing and installing high-pressure pump	322
7.3	Removing and installing high-pressure pipe	326
8	Lambda probe	329
8.1	Exploded view - Lambda probe	329
8.2	Removing and installing Lambda probe	330
9	Engine control unit	334
9.1	Removing and installing engine/motor control unit J623	334
26	Exhaust system	335
1	Exhaust pipes/silencers	335
1.1	Exploded view - silencers	335
1.2	Separating exhaust pipes/silencers	337
1.3	Removing and installing front silencers	339
1.4	Removing and installing silencers	340
1.5	Stress-free alignment of exhaust system	340
1.6	Checking exhaust system for leaks	341
2	Emission control system	343
2.1	Exploded view - emission control system	343
2.2	Removing and installing catalytic converter	344
3	Secondary air system	354
3.1	Exploded view - secondary air system	354
3.2	Removing and installing secondary air pump motor V101	356
3.3	Checking combination valve	357
3.4	Removing and installing combination valve	359
4	Exhaust manifolds	365
4.1	Exploded view - exhaust manifold	365
4.2	Removing and installing exhaust manifold	366

<b>28 - Ignition system</b>	<b>375</b>
1 Ignition system	375
1.1 Exploded view - ignition system	375
1.2 Test data, spark plugs	376
1.3 Removing and installing ignition coils with output stages	376
1.4 Removing and installing knock sensor	379
1.5 Removing and installing Hall senders	379
1.6 Removing and installing engine speed sender G28	380



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

## 00 – Technical data

### 1 Identification

(ARL005810; Edition 05.2018)

⇒ ["1.1 Engine number/engine data", page 1](#)

#### 1.1 Engine number/engine data

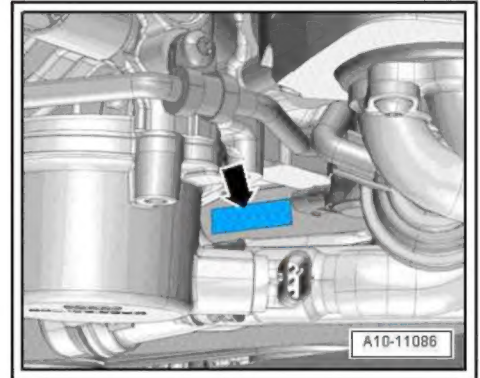
Engine number



Note

*The engine cover panel must be removed to make the engine number visible.*

- ◆ The engine number (engine code and serial number) is located on the top of the cylinder block at the front -arrow-.
- ◆ Engine codes starting with the letter "C" have four letters (previously three letters).
- ◆ The first 3 characters of the engine code stand for the engine capacity and the mechanical construction and design. They are stamped onto the cylinder block together with the serial number.
- ◆ The 4th character indicates the power output and torque of the engine and is determined by the engine control unit.



Note

- ◆ *The four-letter engine code is found on the type plate (certain countries only), vehicle data sticker and engine control unit.*
- ◆ *Fitting locations of the type plate (certain countries only) and the vehicle data sticker ⇒ Maintenance ; Booklet 411 .*

Engine data

- ◆ ⇒ Technical data for engines; Rep. gr. 00 ; Overview of engines



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



## 2 Safety precautions

⇒ ["2.1 Safety precautions when working on the fuel supply system", page 2](#)

⇒ ["2.2 Safety precautions when working on vehicles with start/stop system", page 2](#)

⇒ ["2.3 Safety precautions when using testers and measuring instruments during a road test", page 3](#)

⇒ ["2.4 Safety precautions when working on the cooling system", page 3](#)

⇒ ["2.5 Safety precautions when working on the ignition system", page 3](#)

⇒ ["2.6 Safety precautions when working on the subframe", page 4](#)

⇒ ["2.7 Safety precautions when working on the exhaust system", page 4](#)

### 2.1 Safety precautions when working on the fuel supply system

Risk of injury - fuel system operates under high pressure

The fuel system is pressurised. There is a risk of injury as fuel may spray out.

Before opening the fuel system:

- Put on safety goggles.
- Put on protective gloves.
- Release pressure (wrap a clean cloth around connection and open connection carefully).

Risk of fire due to escaping fuel

If the battery is connected, the door contact switch activates the fuel pump when the driver's door is opened. Escaping fuel may ignite, causing a fire.

- Before opening the fuel system, disconnect power supply to fuel pump.

### 2.2 Safety precautions when working on vehicles with start/stop system

Risk of injury - engine may start unexpectedly

The engine can start unexpectedly if the vehicle's start/stop system is activated. A message in the instrument cluster indicates whether the start/stop system is activated.

- To deactivate the start/stop system, switch off the ignition.

## 2.3 Safety precautions when using testers and measuring instruments during a road test

Risk of injury if test equipment is not secured

If an accident occurs and the front passenger's airbag is triggered, test equipment which is not secured adequately may be catapulted through the vehicle with potentially serious consequences.

- Secure test equipment on the rear seat with a strap.

Or:

- Have a second mechanic operate test equipment on the rear seat.

## 2.4 Safety precautions when working on the cooling system

Risk of scalding as hot coolant can escape

The cooling system is under pressure when the engine is hot. Risk of scalding due to hot steam and hot coolant.

- Put on protective gloves.
- Put on safety goggles.
- Cover filler cap on expansion tank with a cloth and open carefully to release pressure.

## 2.5 Safety precautions when working on the ignition system

Risk of injury due to electric shock

When the engine is running, there are high voltage levels in the ignition system. There is a risk of electric shock when touching the ignition system!

- **Never touch or disconnect ignition wiring when the engine is running or being turned at cranking speed.**

Risk of damage to components

Washing the engine or connecting/disconnecting electrical wiring may result in components being damaged if the engine is running.

- Switch off ignition before connecting/disconnecting electrical wiring.
- Switch off ignition before cleaning engine.



## 2.6 Safety precautions when working on the subframe

When working on the subframe note the following warnings:



### Caution

*Risk of damage to running gear components.*

- ◆ *The vehicle must NOT be lowered onto its wheels if the engine/gearbox mountings, steering rack or subframe cross brace are not properly installed.*
- ◆ *The vehicle must NOT be supported by applying a trolley jack or similar to the subframe or subframe cross brace.*

## 2.7 Safety precautions when working on the exhaust system

When working on the exhaust system please note the following:



### Caution

*Risk of damage to flexible joint.*

- ◆ *Do not bend flexible joint more than 10°.*
- ◆ *Install flexible joint so that it is not under tension.*
- ◆ *Take care not to damage wire mesh on flexible joint.*



## 3 Repair instructions

⇒ ["3.1 Rules for cleanliness", page 5](#)

⇒ ["3.2 Foreign particles in engine", page 5](#)

⇒ ["3.3 Contact corrosion", page 5](#)

⇒ ["3.4 Routing and attachment of pipes, hoses and wiring", page 6](#)

⇒ ["3.5 Installing radiators and condensers", page 6](#)

### 3.1 Rules for cleanliness

Even small quantities of dirt can lead to defects. For this reason, please observe the following rules when working on the fuel supply system, injection system and turbocharger:

- ◆ Clean connections and surrounding area thoroughly with engine cleaner or brake cleaner and dry cleaned area before loosening.
- ◆ Immediately seal open lines and connections with clean plugs, for example from engine bung set - VAS 6122- .
- ◆ After removal, place parts on a clean surface and cover them. Only use lint-free cloths.
- ◆ Carefully cover or seal open components if repairs cannot be carried out immediately.
- ◆ Only install clean components; replacement parts should only be unpacked immediately prior to installation. Do not use parts that have been previously unpacked and stored away loose (e.g. in toolboxes, etc.).
- ◆ Do not work with compressed air when the system is open. If possible, do not move vehicle.
- ◆ Make sure that no fuel runs onto the fuel hoses. Should this occur, the fuel hoses must be cleaned again immediately.
- ◆ Protect unplugged electrical connectors against dirt and moisture and make sure connections are dry when attaching.

### 3.2 Foreign particles in engine

- ◆ When performing assembly work on the engine, all open passages in the intake and exhaust systems must be sealed with suitable plugs (e.g. from engine bung set - VAS 6122- ) to prevent foreign particles from entering the engine.
- ◆ In the event of mechanical damage to one of the cylinder banks, the intake and exhaust systems and combustion chambers of the opposite cylinder bank must always be examined for foreign particles to prevent further damage occurring later.

### 3.3 Contact corrosion

Contact corrosion can occur if unsuitable fasteners are used (e.g. bolts, nuts, washers, etc.).

For this reason, only fasteners with a special surface coating are fitted.

Additionally, all rubber and plastic parts and all adhesives are made of non-conductive materials.

Always install new parts if you are not sure whether used parts can be re-fitted ⇒ Electronic parts catalogue .



Please note:

- ◆ We recommend using only genuine replacement parts; these have been tested and are compatible with aluminium.
- ◆ We recommend using Audi Genuine Accessories.
- ◆ Damage caused by contact corrosion is not covered by warranty.

### 3.4 Routing and attachment of pipes, hoses and wiring

- ◆ Mark fuel lines, hydraulic lines, vacuum lines, lines for activated charcoal filter and electrical wiring etc. before removal so they can be re-installed in the original positions and correctly connected. Make sketches or take photographs if necessary.
- ◆ To avoid damaging pipes, hoses and wiring, ensure sufficient clearance from all moving or hot components in engine compartment (limited space in engine compartment).

### 3.5 Installing radiators and condensers

Even when the radiator and condenser are correctly installed, slight impressions may be visible on the fins of these components. This does not mean that the components are damaged. If the fins are only very slightly distorted, this does not justify renewal of the radiator or the condenser.

## 10 – Removing and installing engine

### 1 Removing and installing engine

⇒ "1.1 Removing engine", page 7

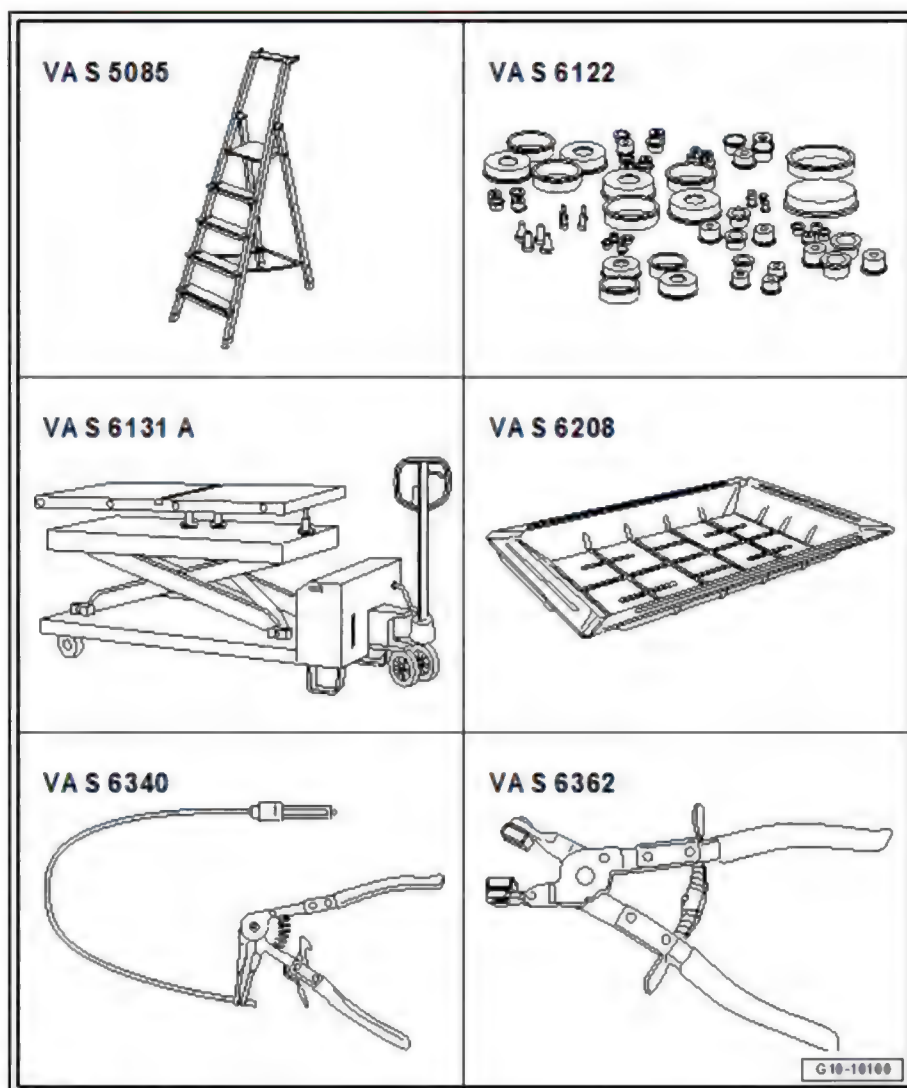
⇒ "1.2 Separating engine and gearbox", page 22

⇒ "1.3 Securing engine to engine and gearbox support",  
page 28

⇒ "1.4 Installing engine", page 31

#### 1.1 Removing engine

Special tools and workshop  
equipment required



◆ Stepladder - VAS 5085-

◆ Engine bung set - VAS 6122-

◆ Scissor-type assembly platform - VAS 6131 B-

◆ Drip tray for workshop hoist - VAS 6208-

◆ Hose clip pliers - VAS 6340-

◆ Hose clip pliers - VAS 6362-



- ◆ Support set for Audi - VAS 6131/10-



- ◆ Supplementary set, Audi A8 >2002 - VAS 6131/11-
- ◆ Supplementary set, Audi Q7 >2005 - VAS 6131/13-



- ◆ Used oil collection and extraction unit - VAS 6622A-

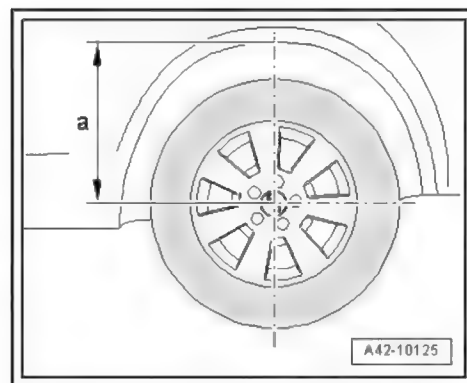


## Procedure



### Note

- ◆ *The engine is removed from underneath together with the gearbox and subframe (with lock carrier installed).*
- ◆ *Re-install all cable ties in the same locations when installing.*
- ◆ *All bolts on running gear components with bonded rubber bushes must be tightened with suspension in unladen position (vehicle unladen).*
- ◆ *Bonded rubber bushes can only be turned to a limited extent. Therefore, before tightening the bolts, suspension components with bonded rubber bushes must be brought into a position corresponding to the normal position while driving (unladen position). Otherwise, the bush would be subject to torsion loading and its service life shortened.*
- ◆ *Before commencing work, use measuring tape or similar to measure dimension -a- from wheel centre to lower edge of wheel housing.*
- ◆ *This measurement must be taken with the suspension in the unladen position (vehicle unladen).*
- ◆ *Note down measurement. This will be needed when tightening the bolts/nuts on the suspension.*



### WARNING

*Make sure the vehicle cannot tip over when the engine is removed.*

- ◆ *Secure the vehicle, to do so, the luggage compartment must be empty.*



### Note

*Move the gearbox to position "N" and release the electromechanical parking brake before disconnecting the battery, so that the propshaft can be turned during removal.*

- Bring front wheels into straight-ahead position.



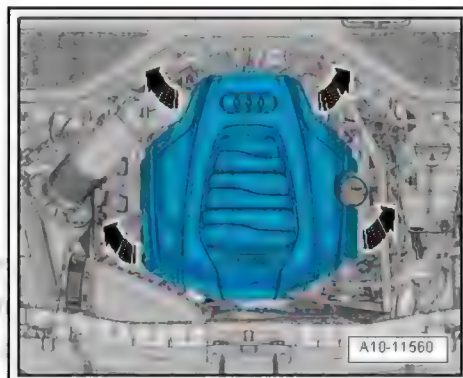
### Caution

*Risk of irreparable damage to electronic components.*

- ◆ *Observe notes on procedure for disconnecting the battery.*

- Switch off ignition.
- Disconnect earth wire from battery terminal ➤ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .
- Discharge refrigerant circuit ➤ Air conditioner with refrigerant R134a; Rep. gr. 87 ; Refrigerant circuit , or ➤ Air conditioners with refrigerant R1234yf - General information; Rep. gr. 87 ; Working with the air conditioner service station; Discharging refrigerant circuit .

- Remove body brace ⇒ Running gear, axles, steering; Rep. gr. 40 ; Suspension strut, upper links; Removing and installing body brace .
- Carefully pull engine cover panel off retaining pins one after another -arrows-. Do not jerk engine cover panel away, and do not try to pull on one side only.
- Remove lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing attachments .

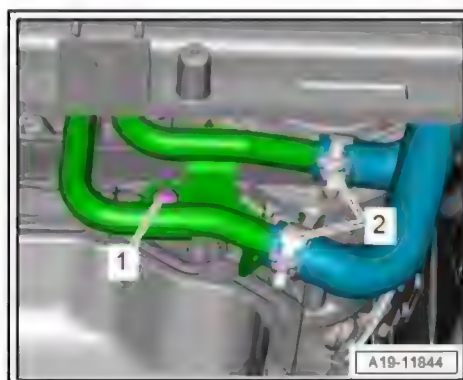


### WARNING

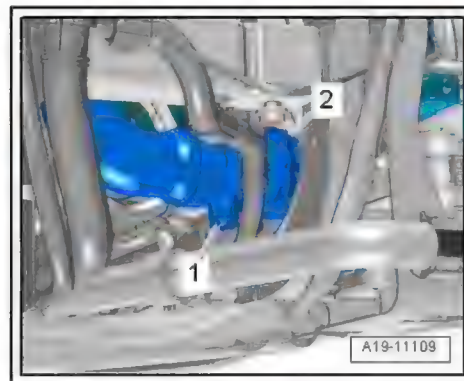
*Risk of scalding due to hot steam and hot coolant.*

- ◆ *The cooling system is under pressure when the engine is hot.*
- ◆ *To allow pressure to dissipate, cover filler cap on coolant expansion tank with cloth and open carefully.*

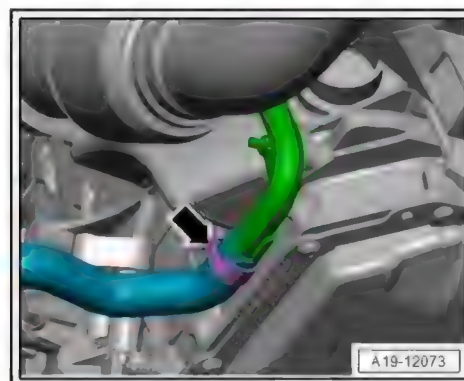
- Open filler cap -arrow- on coolant expansion tank.
- Remove front wheels ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .
- Remove wheel housing liners (front left and front right) ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Removing and installing wheel housing liner (front) .
- Remove noise insulation panels ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Remove propshaft ⇒ Rear final drive; Rep. gr. 39 ; Propshaft; Removing and installing propshaft .
- Place drip tray for workshop hoist - VAS 6208- underneath.
- Release hose clips -2-, disconnect coolant hoses from coolant pipes (front left) and drain off coolant.
- Remove bolt -1-.



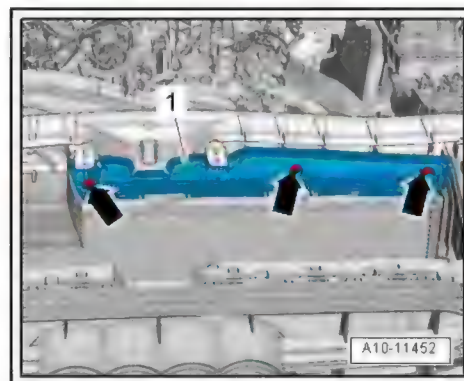
- Remove drain plug -1- and drain off coolant.
- Lift retaining clip -2- and disconnect coolant hose from radiator.



- Release hose clip -arrow-, disconnect coolant hose from coolant pipe (left-side) on gearbox and drain off coolant.



- Remove bolts -arrows- and detach air duct -1-.

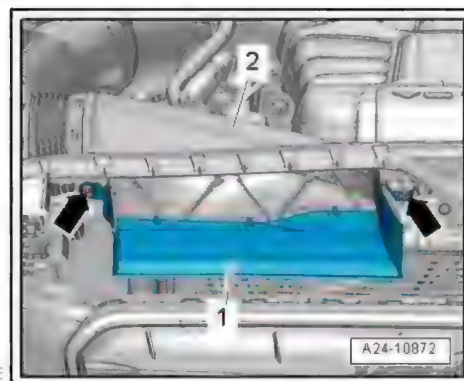


- Remove bolts -arrows- and detach air duct -2- from lock carrier.



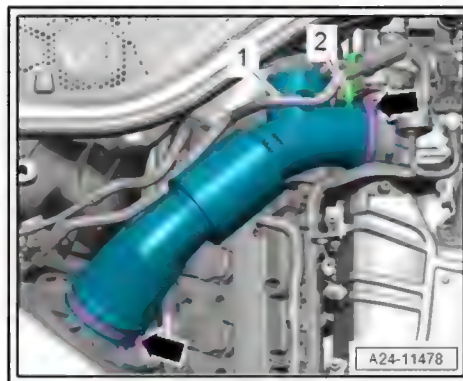
Note

*Disregard item 1-.*



Protected by copyright. Copying for private or commercial purposes is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee the accuracy of the information with respect to the correctness of information in this document. Copyright by AUDI AG.

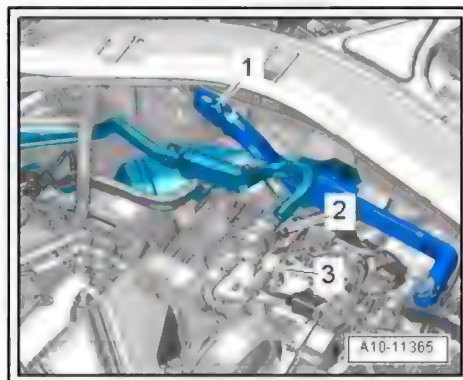
- Move hose -1- from activated charcoal filter system clear at air pipe.
- Detach vacuum hose -2- from connection on air pipe.
- Loosen hose clips -arrows- and detach air pipe.



- Lift off air cleaner housing -1-.
- Press **release tabs** and disconnect secondary air hose -arrow-.



- Release hose clip -1- and disconnect vacuum hose from plenum chamber partition panel.
- Unplug electrical connector -2- at activated charcoal filter solenoid valve 1 - N80- and detach vacuum hose -3- (press release tabs).
- Detach activated charcoal filter solenoid valve 1 - N80- from bracket and move it clear to the side with hoses still attached.



Caution

*Take care to keep components clean.*

- ♦ *Observe rules for cleanliness when working on the fuel supply system ➔ "3.1 Rules for cleanliness", page 5.*



# **WARNING**

*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

- *Put on safety goggles.*
- *Put on protective gloves.*
- *Release pressure (wrap a clean cloth around connection and open connection carefully).*

- Disconnect fuel hose -1- ➔ Fuel supply system; Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .
- Seal off open lines and connections with plugs (thoroughly cleaned) from engine bung set - VAS 6122- .

- Lift retaining clip -arrow- and detach coolant hose going to heat exchanger for heater (rear).

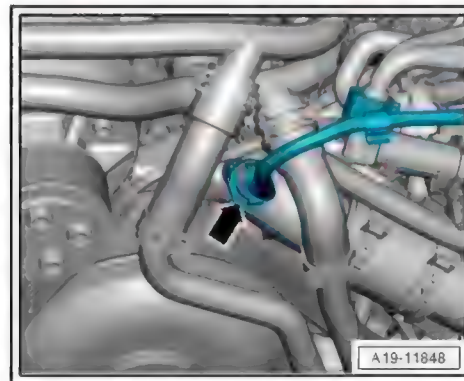
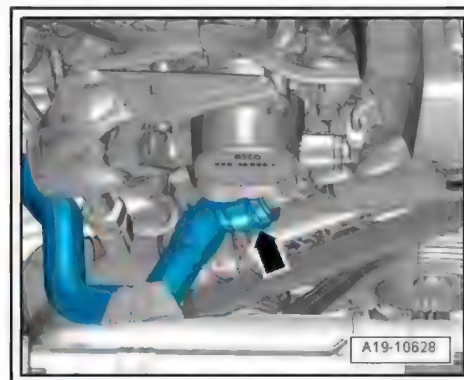
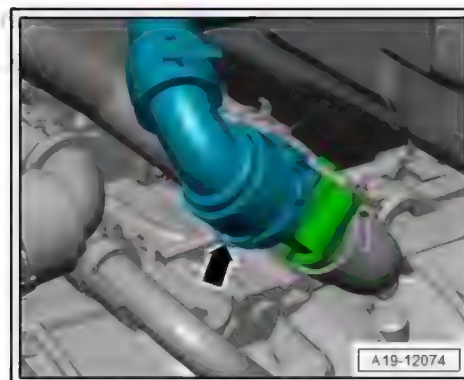
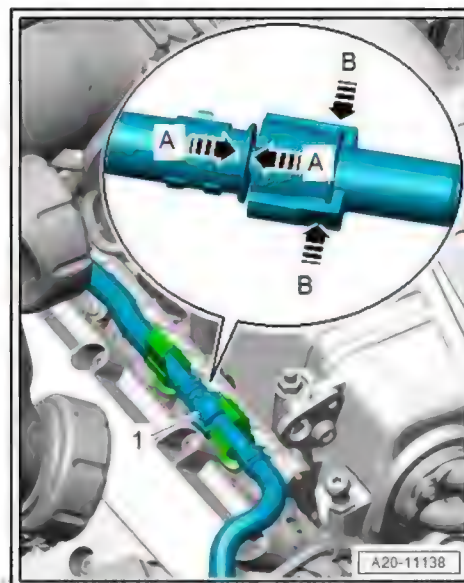


## **Note**

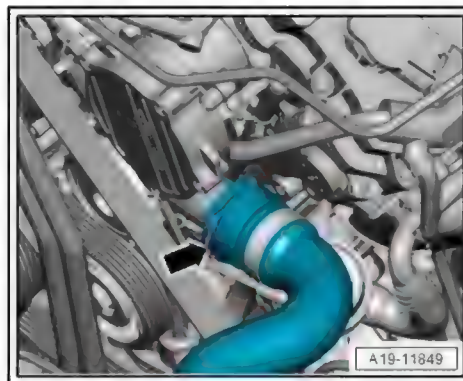
*For illustration purposes, the installation position is shown with the plenum chamber partition panel removed.*

- Lift retaining clip -arrow- and detach coolant hose (front right) from coolant pipe (front).

- Lift retaining clip -arrow- and disconnect coolant line.
- Move coolant line clear and push to left side.



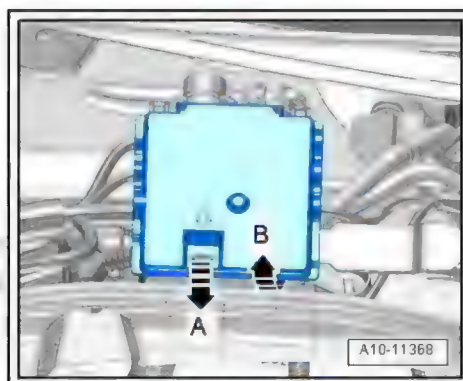
- Lift retaining clip and detach coolant hose -arrow- from coolant pipe (front).



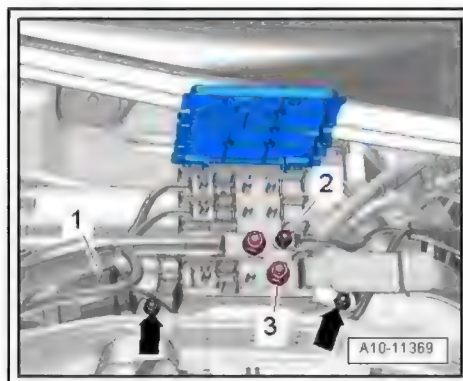
- Release retainer -arrow A- and open cover -arrow B-.



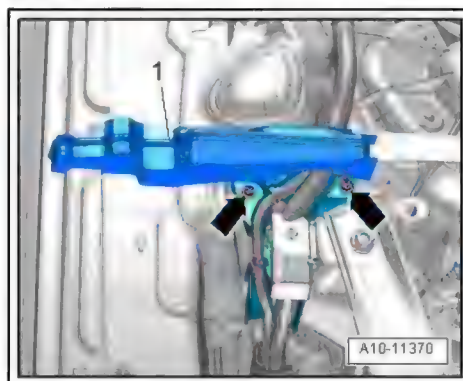
Protected by copyright. Copying for private use is permitted without authorization by AUDI AG. All rights reserved. For more information, please contact your local Audi representative.



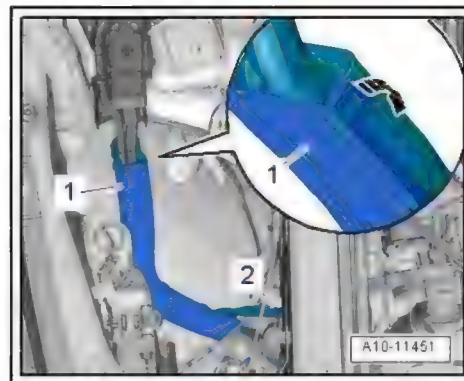
- Remove nuts -2 and 3- and move electrical wiring clear.
- Detach electrical connector -1- from bracket and unplug.
- Remove bolts -arrows- and detach terminal 30 wiring junction 2 - TV22- from plenum chamber partition panel.



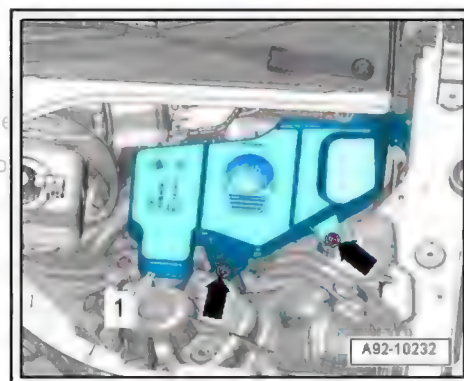
- Press foam wedge -1- to one side.
- Remove bolts -arrows-.



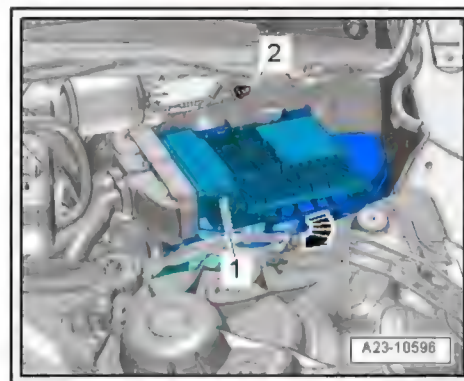
- Unscrew nut -2- on longitudinal member (right-side) and move earth cables clear.
- Release catch -arrow- to open wiring duct -1- and move electrical wiring harness clear.



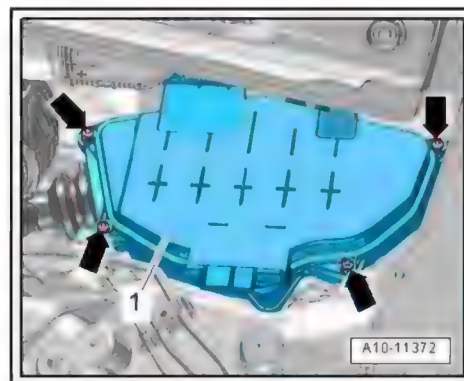
- Place drip tray for workshop hoist - VAS 6208- underneath.
- Unscrew bolts -arrows- and pull filler neck -1- out of washer fluid reservoir and through opening in body to right side.



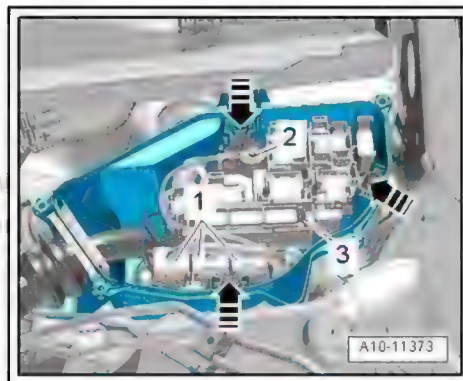
- Remove cap nut -2- and move earth wiring clear.
- Release fastener -arrow-, detach engine control unit - J623- item 1- from bracket and swivel it to one side.



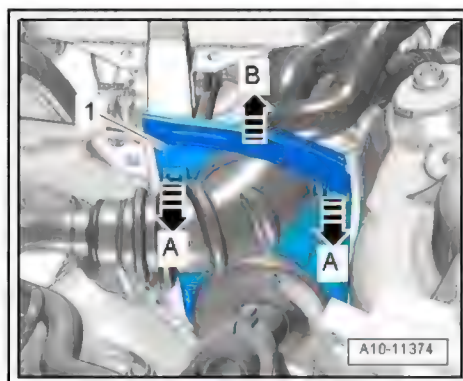
- Remove bolts -arrows- and detach cover -1- for electronics box in plenum chamber.



- Unplug electrical connectors -1- and unscrew nut -2- for electrical wiring.
- Release catches -arrows- and detach relay carrier with fuse holder -3-.
- Disengage engine wiring harness at electronics box in plenum chamber and move clear.



- Release catches -arrows A- and lift off wiring protector -1- -arrow B-.
- Move wiring harness clear and place on top of engine.
- Secure engine control unit - J623- to prevent it falling.

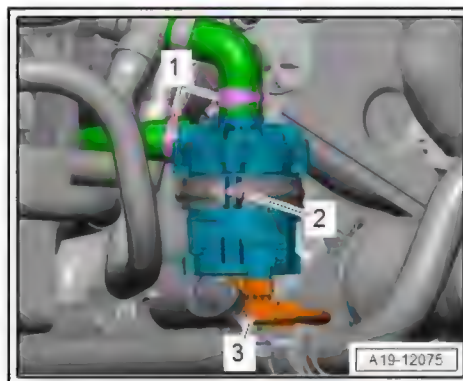


- Unplug electrical connector -3- from charge air cooling pump - V188- and move clear.

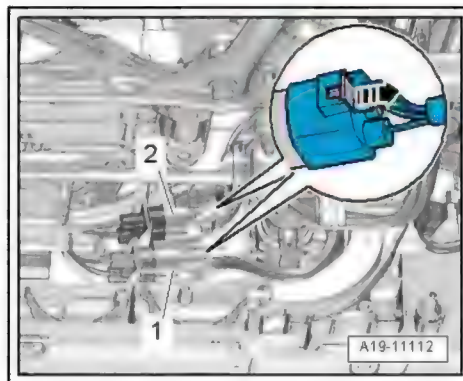


#### Note

Disregard items -1 and 2-.



- Unplug electrical connectors -1, 2- for radiator fan (push retainer to the rear -arrow- and press down release catch).
- Move electrical wiring harness clear.
- Remove air intake grille (right-side) ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing attachments .

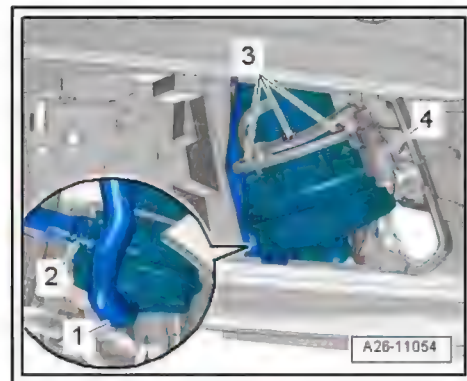


- Unplug electrical connector -4- at secondary air pump motor - V101- and move electrical wiring clear.
- Press release tabs, disconnect secondary air hose -2- and move hose clear.



Note

*Disregard items -1 and 3-.*

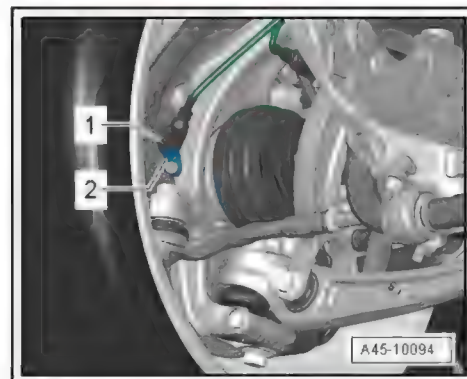


- Unplug electrical connector -1- at front wheel speed sensors on both sides.

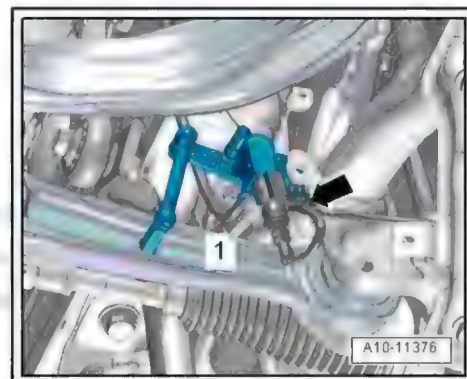
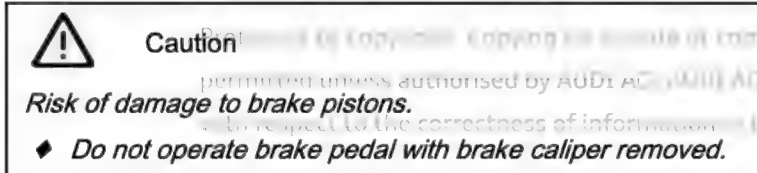


Note

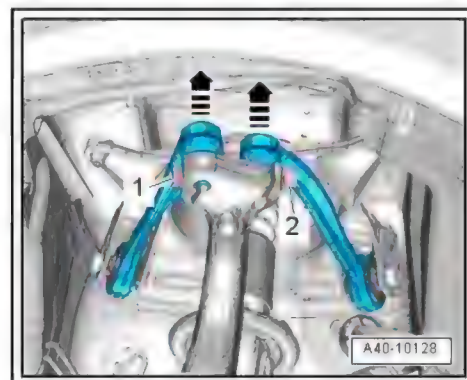
*Disregard -item 2-.*



- If fitted, unplug electrical connector -1- on front vehicle level senders (both sides) and move electrical wiring clear -arrow-.
- Remove brake caliper and tie up in wheel housing with wire (brake hose remains attached) ⇒ Brake system; Rep. gr. 46 ; Front brakes; Removing and installing brake caliper .



- Remove nut -2- and pull out bolt -1-.
- Pull upper suspension links upwards out of wheel bearing housing -arrows-.
- Repeat procedure on opposite side of vehicle.



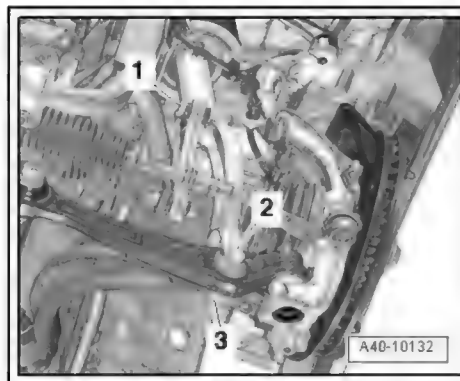


- Remove bolt -1- for anti-roll bar on both sides.
- Remove nut -3- on both sides.



Note

The bolts -2- are removed at a later stage.



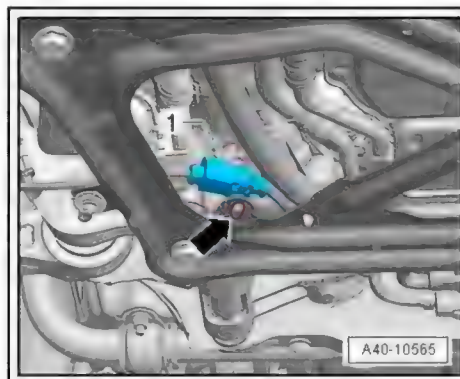
- Move clip clear -arrow-.
- Unplug electrical connector -1- and move wiring clear.
- Remove subframe cross brace ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Removing and installing subframe cross brace .



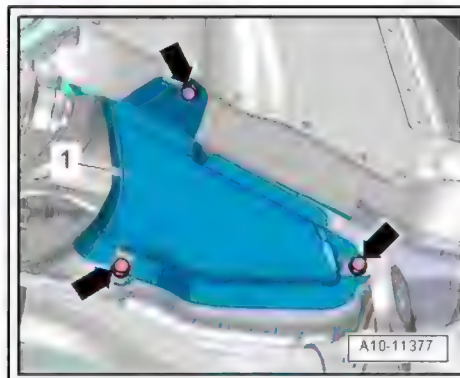
Caution

*Risk of damage to running gear components.*

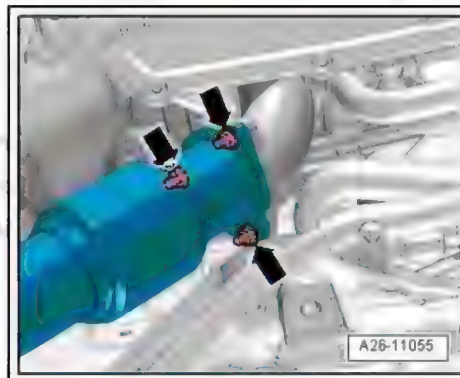
- ♦ The vehicle must NOT be lowered onto its wheels if the engine/gearbox mountings, steering rack or subframe cross brace are not properly installed.



- Remove bolts -arrows- on both sides and detach heat shield -1- for longitudinal member.



- Unscrew nuts -arrows- on both sides and detach front silencer.
- Detach intermediate steering shaft from steering rack and move clear by telescoping splines together ⇒ Running gear, axles, steering; Rep. gr. 48 ; Steering column; Removing and installing intermediate steering shaft.



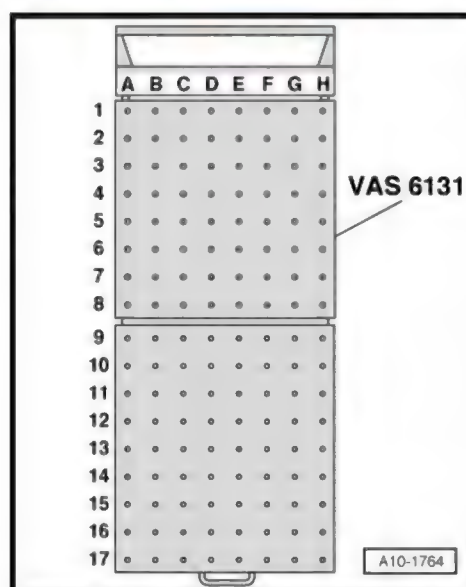
- Unplug electrical connector -2- at steering rack (release retainer -arrow- and press down release catch).
- Unplug electrical connector -1-.
- Move electrical wiring harness clear.



Set up the scissor-type assembly platform as follows:

- Set up scissor-type assembly platform - VAS 6131 B- with support set for Audi - VAS 6131/10- , support set -VAS 6131/11- and supplementary set -VAS 6131/13- as follows:

Platform coordinates	Parts of support set for Audi - VAS 6131/10- , support set -VAS 6131/11- and supplementary set -VAS 6131/13-			
B4	/13-4	/10-4	/10-5	/13-1
G4	/13-4	/10-4	/10-5	/13-1
B6	/10-1	/10-2	/10-5	/10-11
G6	/10-1	/10-2	/10-5	/10-11
A8+C8	/13-6	–	–	/13-2
F8+H8	/13-5	–	–	/13-2
B14	/10-1	/10-3	/10-5	/11-1
G14	/10-1	/10-4	/10-5	/11-1



- Initially hand-tighten the support elements on the scissor-type assembly platform.
- Position scissor-type assembly platform - VAS 6131 B- horizontally.
- Take note of spirit level (bubble gauge).
- Position scissor-type assembly platform - VAS 6131 B- below engine/gearbox assembly.

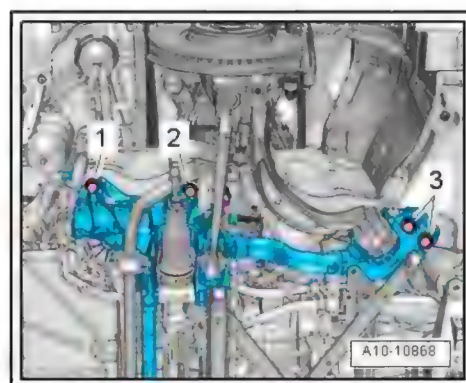


#### WARNING

*Accident risk if subframe mountings are detached.*

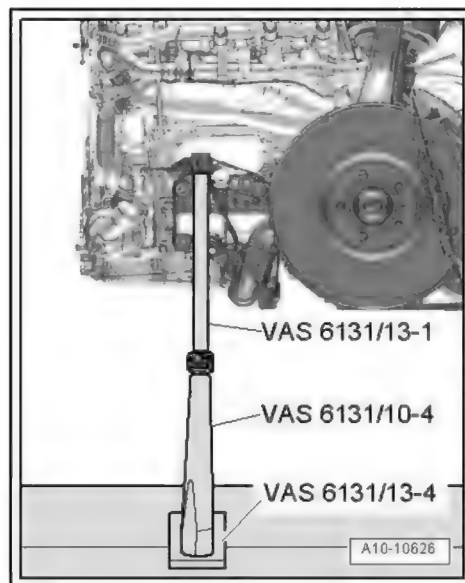
♦ *Subframe bolts -2- and -3- must not be loosened.*

- Remove subframe bolt -1- on both sides.

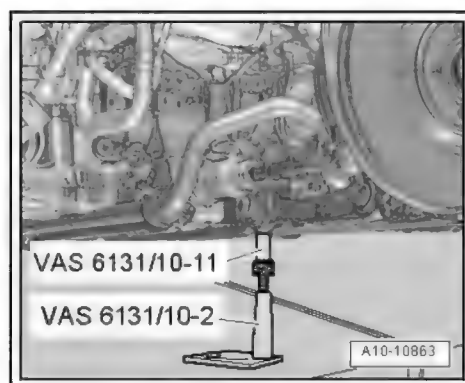


Produced by power-act. Copying for private use is permitted without charge by Audi AG. Audi AG assumes no liability for the accuracy of the information in this document. Copyright by Audi AG.

- Position support elements from -VAS 6131/10- and -VAS 6131/13- at front left and right of subframe as shown.
- Make sure that threaded spindles are screwed in completely.



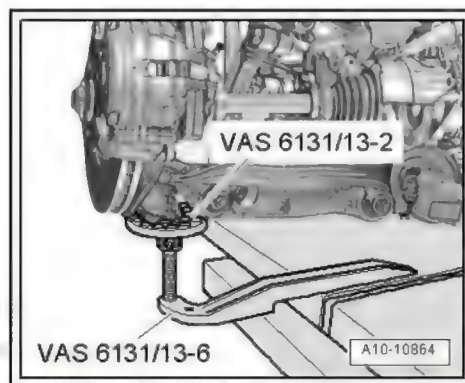
- Position support elements from -VAS 6131/10- (rear left and right) at front attachment points of subframe cross brace as shown.



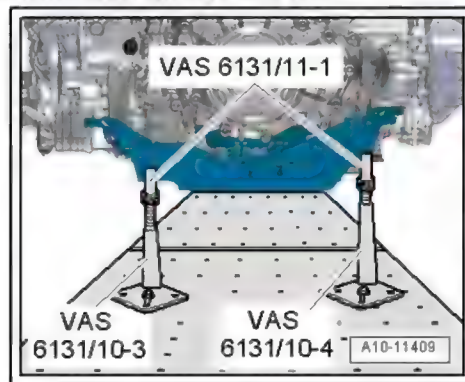
- Position support elements from -VAS 6131/13- under left and right wheel bearing housings as shown.



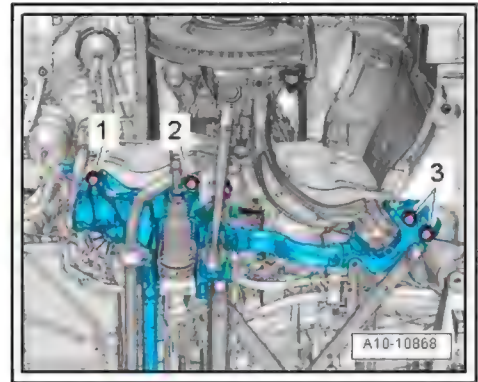
Warranty is limited to the original parts and accessories supplied by Audi AG. The warranty is void if the parts and accessories are not installed correctly or if the vehicle is used for purposes other than those intended by Audi AG.



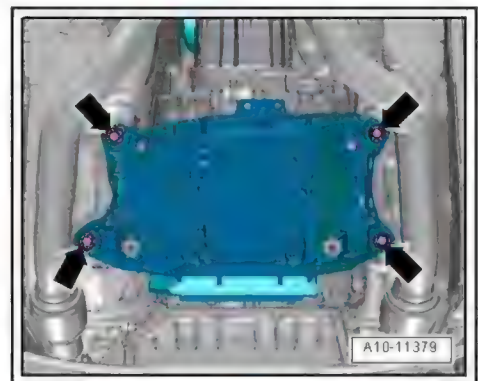
- Position support elements from -VAS 6131/10- and -VAS 6131/11- (rear left and right) at tunnel cross member as shown.
- Turn all spindles for support elements upwards until all locating lugs make contact with mounting points.
- Tighten base plates for support elements to 20 Nm on scissor-type assembly platform - VAS 6131 B- .




- Mark installation position of subframe and tunnel cross member on longitudinal members with felt-tip pen.
- Unscrew subframe bolts -2- and -3- on both sides in several stages and in diagonal sequence.

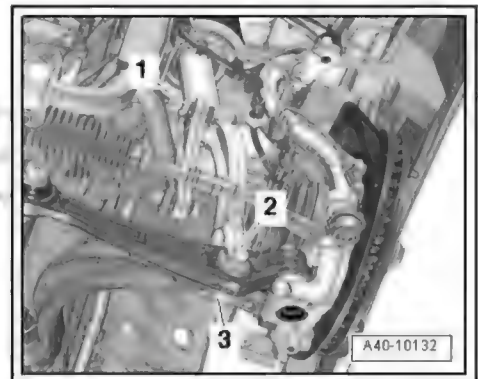


- Remove bolts -arrows- on tunnel cross member.

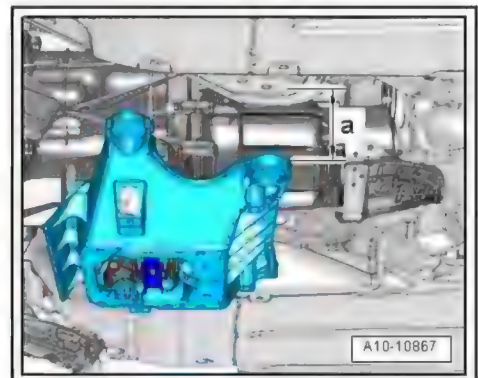


- Remove bolt -2- on both sides.

 **Caution**  
*Danger of damage to hoses, pipes and wiring connections and to engine compartment.*  
 ♦ Check that all hoses and wiring connections between engine, gearbox, subframe and body have been detached.  
 ♦ Carefully guide out engine/gearbox assembly with subframe from engine compartment when lowering.



- Lower engine/gearbox assembly using scissor-type assembly platform - VAS 6131 B- initially only as far as distance -a-.
- Dimension -a- = 100 mm (maximum).





- Pry ball socket -2- of selector lever cable off gearbox selector lever using removal lever - 80 - 200- .
- Press off securing clip -1- and remove selector lever cable from gearbox.



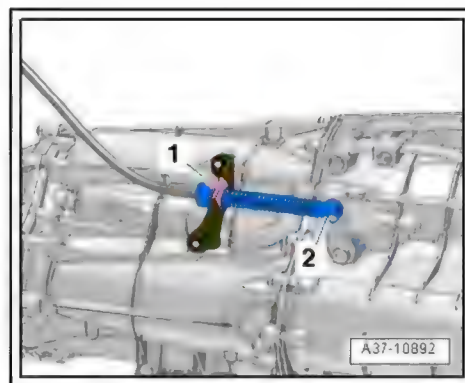
#### Note

*Take care not to bend or kink selector lever cable.*

- Remove refrigerant lines from air conditioner compressor ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching refrigerant lines at air conditioner compressor .

-Pull out Lower engine/gearbox assembly further.

- Pull out scissor-type assembly platform VAS 6131 B- with engine/gearbox assembly from underneath vehicle.



## 1.2 Separating engine and gearbox

Special tools and workshop equipment required

- ♦ Support set for Audi - VAS 6131/10-



- ♦ Supplementary set, Audi A8 >2002 - VAS 6131/11-
- ♦ Support -VAS 6131/13-7- from support set, Audi Q7 >2005 - VAS 6131/13-

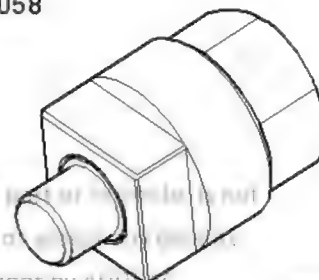


◆ Adapter - T40058-



Intended for customer. Carrying the name in commercial purposes is not permitted. All rights reserved. Audi AG, Audi AG does not give any warranty for the information in this document. Copyright by Audi AG.

T40058



W00-10109

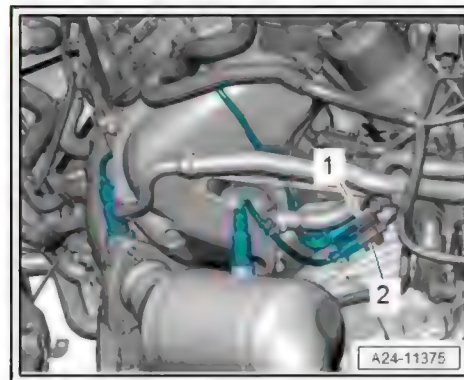
Procedure

- Engine/gearbox assembly removed and secured to scissor-type assembly platform - VAS 6131 B-
- Remove poly V-belt tensioner for supercharger  
⇒ ["1.3.1 Removing and installing tensioner for poly V-belt for supercharger", page 51](#) .
- Take electrical connector -2- for Lambda probe 2 after catalytic converter - G131- out of bracket, unplug and move wiring clear.



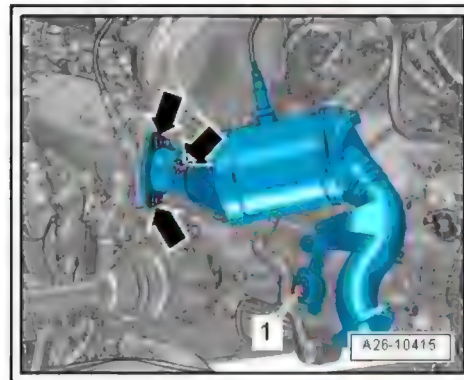
Note

*Disregard -item 1-.*



A24-11375

- Remove nuts -arrows- and bolt -1- and detach catalytic converter (left-side).



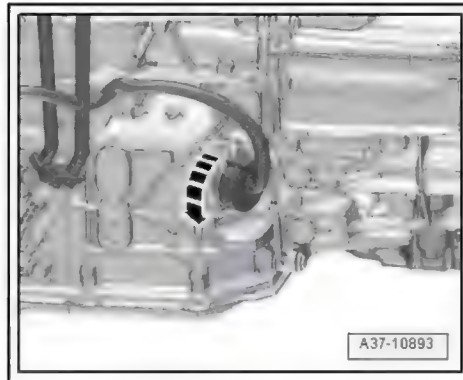
A26-10415



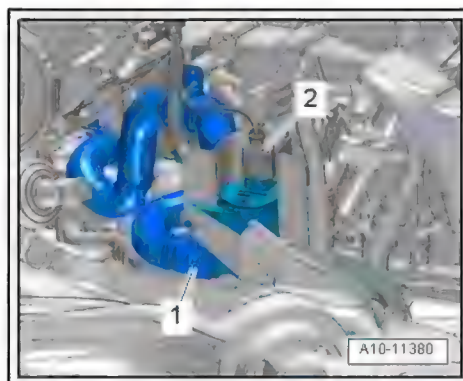
### Caution

*Risk of irreparable damage to gearbox control unit (mechanic unit) because of static discharge.*

- ◆ *Before unplugging or plugging in electrical connector, mechanic must "discharge static" by briefly touching vehicle earth, heater or lifting platform.*
- ◆ *Do NOT touch connector contacts in gearbox connector with your hands.*



- Turn retainer catch anti-clockwise -arrow- and unplug electrical connector at gearbox.
- Move electrical wiring harness clear at gearbox.
- Unplug electrical connector -2- on gearbox oil cooling valve - N509- and move electrical wire clear.
- Release hose clip -1- and detach coolant hose.

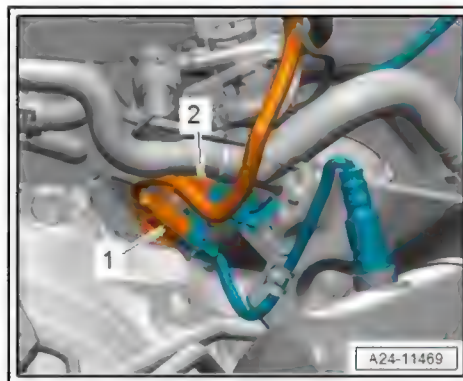


- Remove electrical connector -1- for Lambda probe after catalytic converter - G130- from bracket and unplug connector.

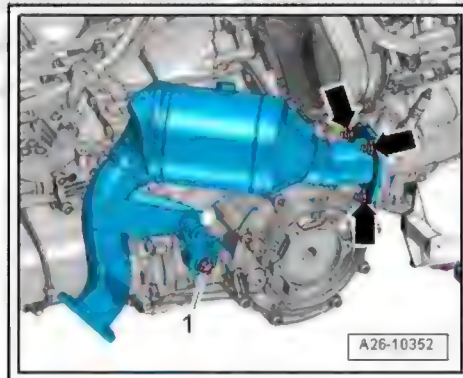


### Note

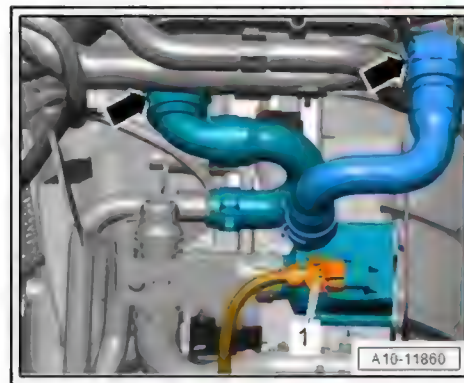
*Disregard -item 2-.*



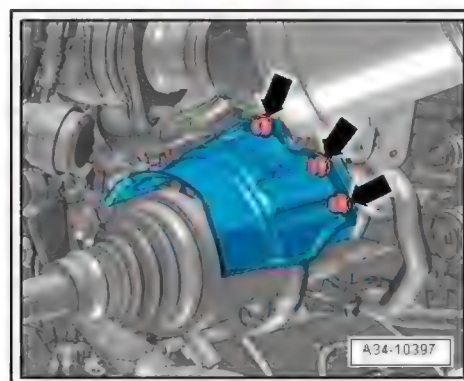
- Remove nuts -arrows- and bolt -1- and detach catalytic converter (right-side).



- Lift retaining clips -arrows- and detach connection.
- Unplug electrical connector -1- at coolant circulation pump - V50- .



- Remove bolts -arrows- and detach heat shield for drive shaft (left-side).
- Unbolt drive shaft (left and right) from gearbox flange shafts  
 ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft;  
 Removing and installing drive shaft .



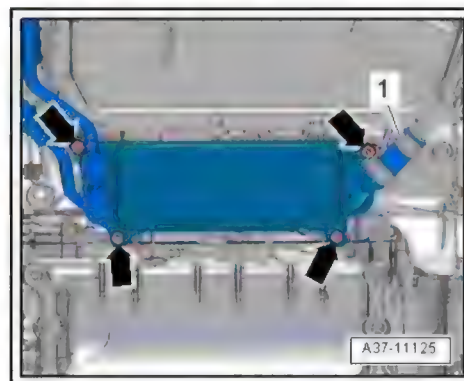
- Remove bolts -arrows-.



Note

*Place a cloth underneath to catch escaping ATF.*

- Release hose clip -1- and detach ATF cooler from coolant pipe on right side of gearbox.
- Swivel ATF cooler to the side.

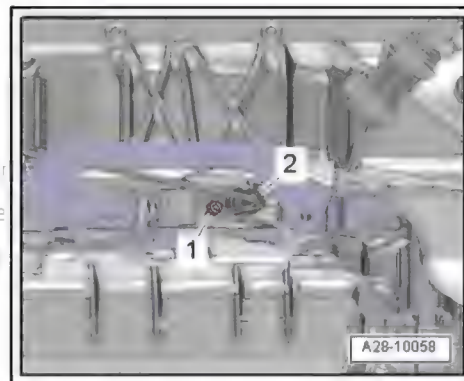


- Unplug electrical connector -2- at engine speed sender - G28- and move wiring clear.

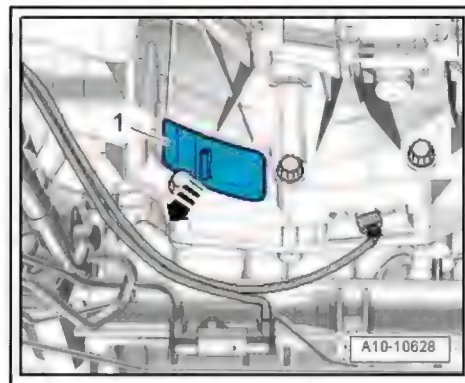


Note

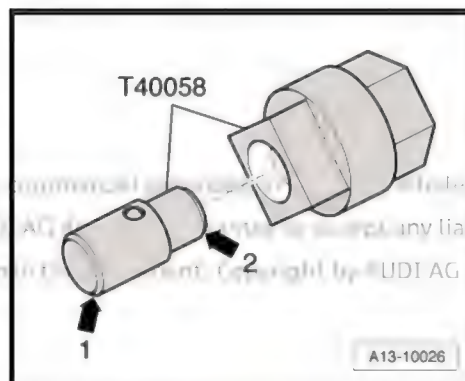
Protected by copyright. Copying for private or commercial purposes, in part or  
**Disregard -item 1-**  
 permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept  
 with respect to the correctness of information in 1



- Detach bottom cover -1- from gearbox -arrow-.



- Insert guide pin of adapter -T40058- as follows:
  - The larger-diameter section -arrow 1- faces towards the engine.
  - The smaller-diameter section -arrow 2- faces the adapter.

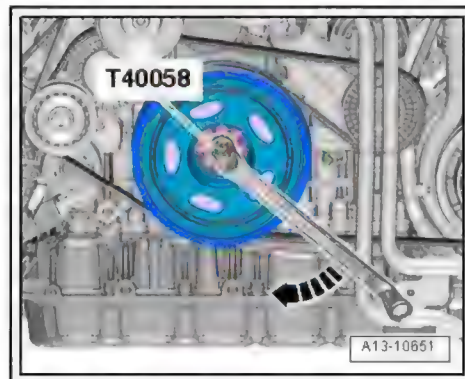


- Counterhold crankshaft using adapter - T40058- and angled ring spanner when loosening bolts for drive plate.

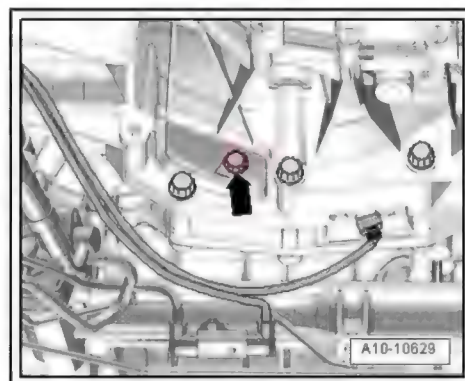


Note

*Only rotate crankshaft in direction of engine rotation -arrow-.*



- Remove 6 bolts -arrow- for clutch module. Turn crankshaft 60° in direction of engine rotation each time.



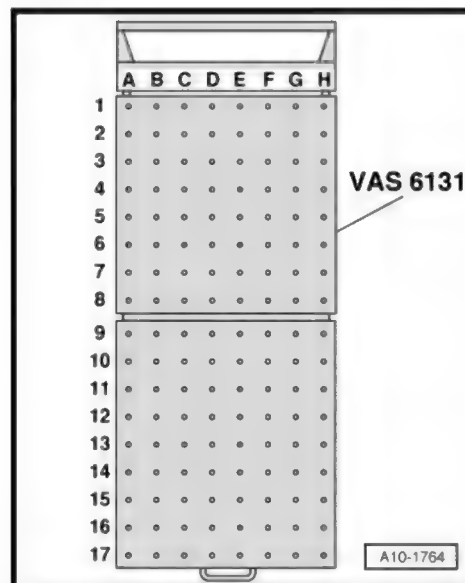
- Set up scissor-type assembly platform - VAS 6131 B- with support set for Audi - VAS 6131/10- , supplementary set -VAS 6131/11- and support -VAS 6131/13-7- as follows:



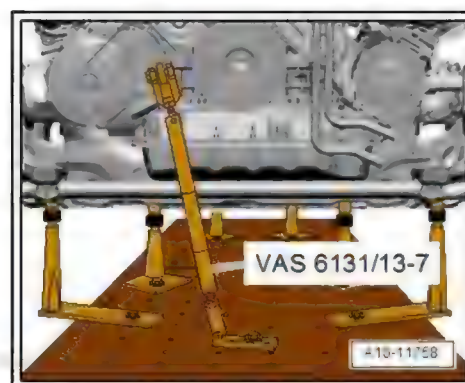
Note

*The other support elements remain unchanged.*

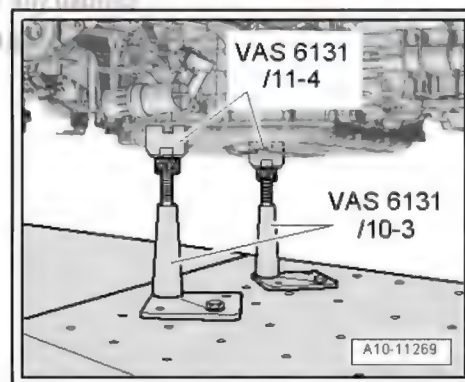
Platform coordinates	Parts from support set for Audi - VAS 6131/10- , supplementary set -VAS 6131/11- and support - VAS 6131/13-7-			
F2	/13-7			
B10	/10-1	/10-3	/10-5	/11-4
G10	/10-1	/10-3	/10-5	/11-4



- Secure support -VAS 6131/13-7- at tapped hole for poly V-belt tensioner for air conditioner compressor at front of engine (right-side) as illustrated.
- Secure support -VAS 6131/13-7- to scissor-type assembly platform and tighten to 20 Nm.



- Position support elements from -VAS 6131/10- and mountings -VAS 6131/11-4- at front of gearbox, as shown in illustration.
- Screw spindles upwards on both sides until mountings - VAS 6131/11-4- make full contact with gearbox.
- Tighten base plates for support elements to 20 Nm on scissor-type assembly platform - VAS 6131 B- .

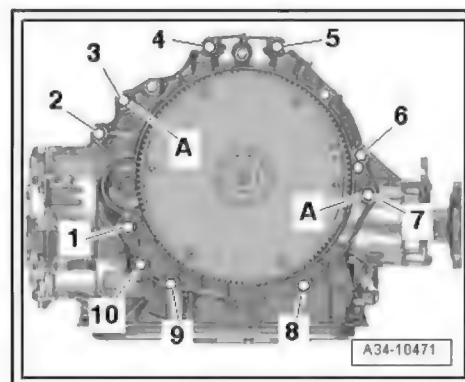


- Remove bolts -1- and -2- for starter.
- Separate starter from gearbox and leave in position.
- Unscrew remaining bolts -3 ... 10- securing engine to gearbox.

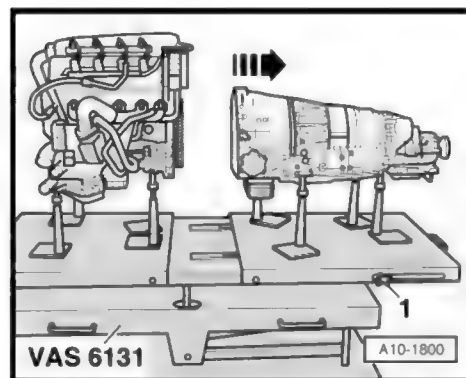


Note

*Disregard -item A-.*

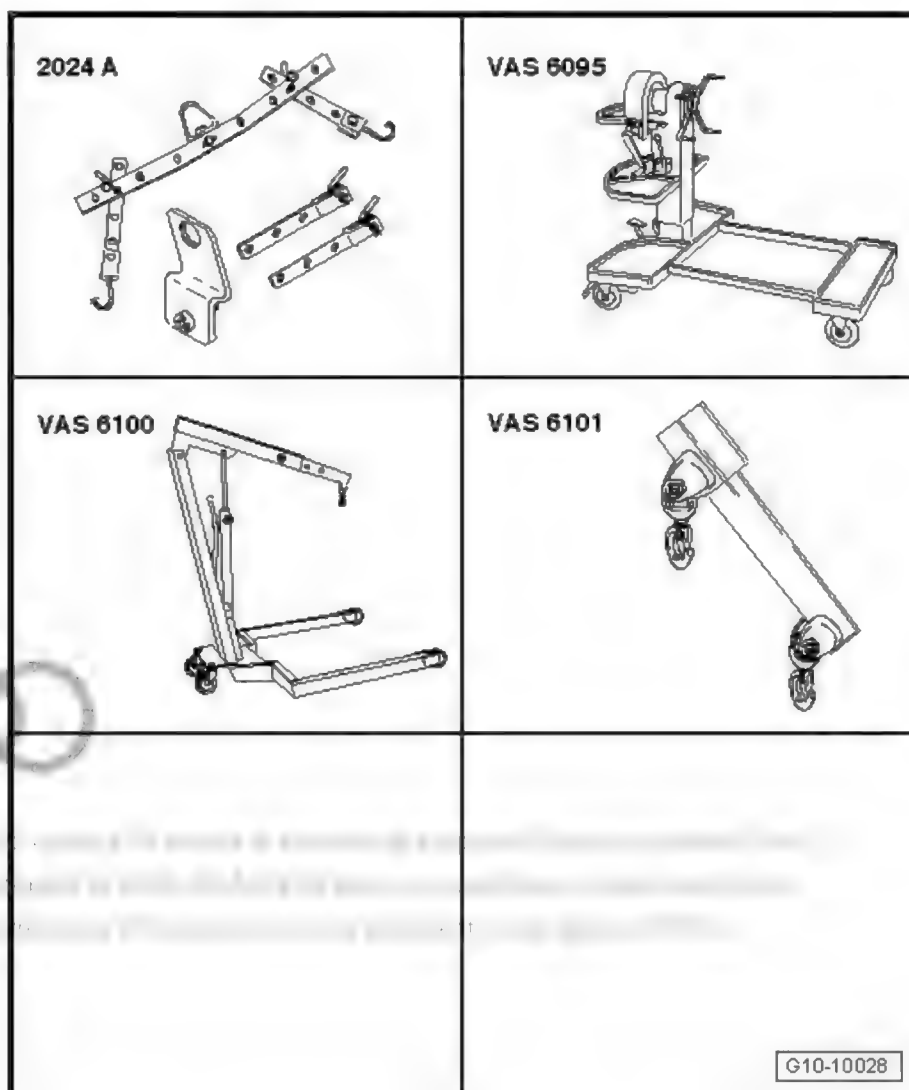


- Loosen clamping bolts -1- on sides of scissor-type assembly platform - VAS 6131 B- and pull rear section of platform together with gearbox towards rear -arrow-.



### 1.3 Securing engine to engine and gearbox support

Special tools and workshop equipment required



- ◆ Lifting tackle - 2024A-
- ◆ Engine and gearbox support - VAS 6095- with universal mounting - VAS 6095/1- and bracket for V6 FSI engine, Audi A6 - VAS 6095/1-5-
- ◆ Workshop hoist - VAS 6100-
- ◆ Lift arm extension (workshop hoist) - VAS 6101-

## Procedure

- Engine/gearbox assembly removed and secured to scissor-type assembly platform - VAS 6131 B- (with engine detached from gearbox)  
⇒ ["1.2 Separating engine and gearbox", page 22](#) .
- Engine secured with support -VAS 6131/13-7- .
- Detach poly V-belt from air conditioner compressor  
⇒ ["1.2.2 Removing and installing poly V-belt for ancillaries", page 48](#) .
- Remove air conditioner compressor ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching air conditioner compressor at bracket .



### WARNING

*Risk of accident!*

- ◆ *The engine can only be transported with the gearbox removed using the method described.*

- Attach lifting tackle - 2024A- to engine lifting eyes and workshop hoist - VAS 6100- with lift arm extension (workshop hoist) - VAS 6101- as shown in illustration.



### Note

*To adjust to the centre of gravity of the assembly, the perforated rails of the support hooks must be positioned as shown.*



### WARNING

*Risk of accident.*

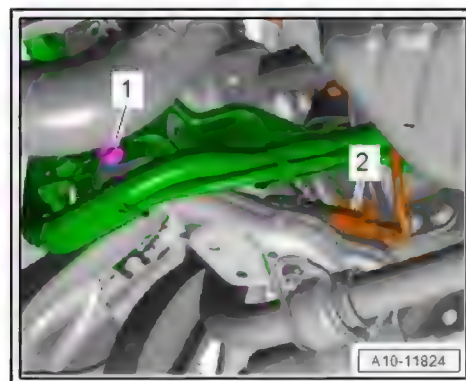
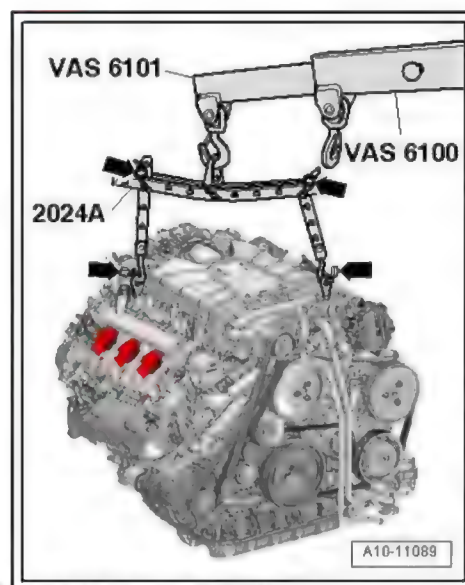
- ◆ *The support hooks and retaining pins on the lifting tackle must be secured with locking pins -arrows-.*

- Take up weight of engine with workshop hoist, but do not lift.
- If fitted, take electrical connectors -2- for electrohydraulic engine mounting solenoid valves out of brackets and unplug (both sides).
- Unscrew bolt -1- and detach bracket with electrical wiring from subframe.



### Note

*The illustration shows the installation position with the engine installed.*





- Remove bolt -2- for engine mounting on both sides.



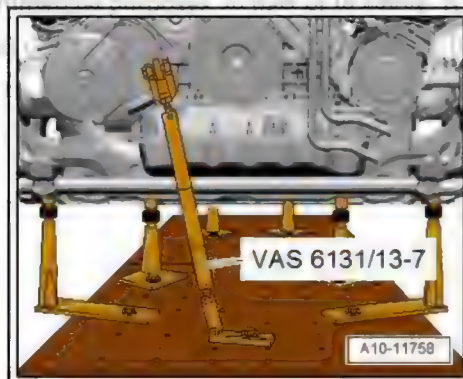
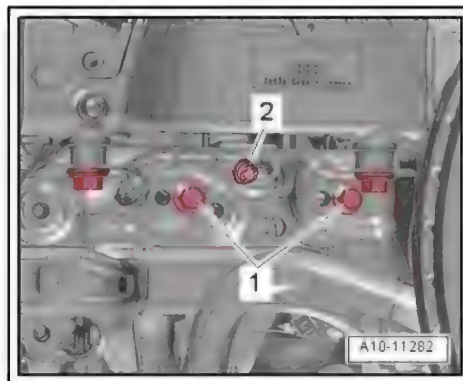
Note

Disregard -item 1-.

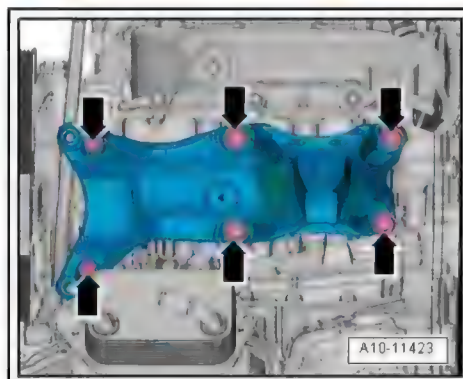


- Remove support -VAS 6131/13-7- from engine.

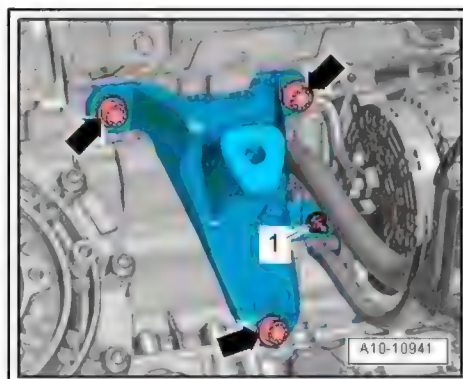
- Lift engine off engine cross member.



- Remove bolts -arrows- and detach engine support (left-side) with bracket for air conditioner compressor.



- Remove nut -1- and move earth wire clear at engine support.
- Unscrew bolts -arrows- and remove engine support (right-side).
- Tie up starter on engine.



- Secure engine with universal mounting - VAS 6095/1- and support bracket for V6 FSI engine, Audi A6 - VAS 6095/1-5- to engine and gearbox support - VAS 6095- as shown in illustration and tighten to 40 Nm.



Printed by copyright. Copying for resale or commercial purposes, or for other purposes, is prohibited unless authorized by AUDI AG. AUDI AG does not guarantee the accuracy of the information with regard to the correctness of information in this document. Copyright © AUDI AG



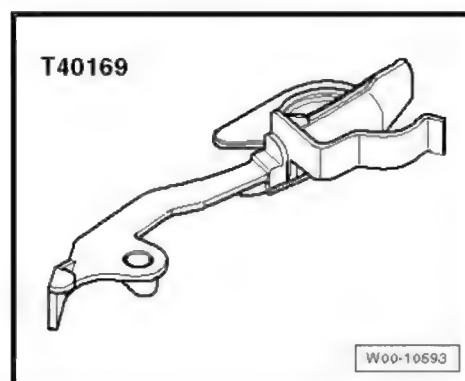
## 1.4 Installing engine

Special tools and workshop equipment required

- ◆ Ring spanner insert AF 16 - V.A.G 1332/14-

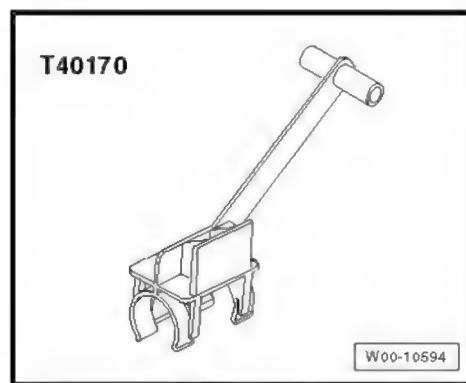


- ◆ Assembly aid - T40169-





## ◆ Transportation lock - T40170-



## Tightening torques



## Note

- ◆ *Tightening torques apply only to lightly greased, oiled, phosphated or black-finished nuts and bolts.*
- ◆ *Additional lubricants such as engine or gearbox oil may be used, but do not use lubricants containing graphite.*
- ◆ *Do not use de-greased parts.*
- ◆ *Tolerance for tightening torques:  $\pm 15\%$ .*

Component		Nm
Bolts/nuts	M6	9
	M7	15
	M8	20
	M10	40
	M12	65

- ◆ [⇒ "2.1 Exploded view - assembly mountings", page 37](#)
- ◆ Bolts securing engine to gearbox ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Removing and installing gearbox; Tightening torques for gearbox
- ◆ Bolts securing engine to gearbox ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Removing and installing gearbox; Tightening torques for gearbox



Copyright © 2018 Audi AG. All rights reserved. Audi AG is not responsible for any damage or liability arising from the use of this document. Audi AG is not responsible for any damage or liability arising from the use of this document. Audi AG is not responsible for any damage or liability arising from the use of this document.

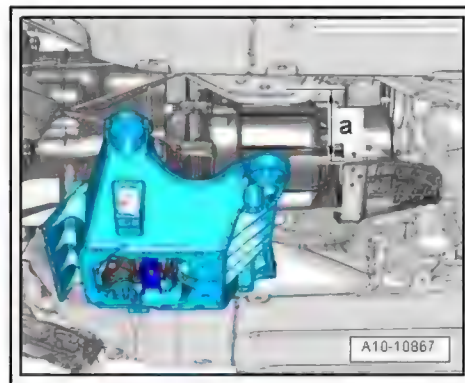
## Procedure



### Note

- ◆ *Renew bolts tightened with specified tightening angle.*
- ◆ *Renew self-locking nuts and bolts as well as seals, gaskets and O-rings after removal.*
- ◆ *Do not remove plugs or protective caps until you are ready to fit the relevant line.*
- ◆ *Hose connections and air pipes/hoses must be free of oil and grease prior to fitting.*
- ◆ *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*
- ◆ *To ensure that the air hoses can be properly secured at their connections, spray rust remover onto the worm thread of used hose clips before installing.*
- ◆ *Re-install all cable ties in the same locations when installing.*
- Engine with subframe positioned on scissor-type assembly platform - VAS 6131 B-
- Engine secured with support -VAS 6131/13-7- .
- Before installing gearbox, remove residue from threaded holes for engine/gearbox bolts in cylinder block using a thread tap.
- Install engine support and engine mounting  
⇒ ["2.1 Exploded view - assembly mountings", page 37](#) .
- Join engine and gearbox; the procedures for doing so are given in the following sections:
- ◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Removing and installing gearbox; Installing gearbox
- ◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Removing and installing gearbox; Installing gearbox .
- Install starter ⇒ Electrical system; Rep. gr. 27 ; Starter; Exploded view - starter .
- Install ATF cooler ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; ATF circuit; Removing and installing ATF cooler / ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; ATF circuit; Removing and installing ATF cooler .
- Install drive shafts and heat shield ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Exploded view - drive shaft
- Install catalytic converters  
⇒ ["1.1 Exploded view - silencers", page 335](#) .

- Raise engine/gearbox assembly using scissor-type assembly platform - VAS 6131 B- only until distance between subframe and body is -a-.
- Dimension -a- = min. 100 mm.
- Install selector lever cable and adjust if necessary.
- ◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Selector mechanism; Removing and installing selector lever cable
- ◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Selector mechanism; Removing and installing selector lever cable
- Install refrigerant lines ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching refrigerant lines at air conditioner compressor .
- Align subframe and tunnel cross member on longitudinal members according to markings made before removal.
- Tighten bolts for tunnel cross member:
- ◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings
- ◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings
- Tighten subframe bolts only to specified torque (do not turn further); the bolts should only be fully tightened after performing the wheel alignment check ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Exploded view - subframe .



# WARNING

*Risk of accident if bolted connections are loose.*

- ◆ *Do NOT drive the vehicle unless the subframe bolts have been tightened to their final torque.*

Remaining installation steps are carried out in reverse sequence; note the following:

- Install propshaft ⇒ Rear final drive; Rep. gr. 39 ; Propshaft; Removing and installing propshaft .
- Install front silencers  
⇒ ["1.3 Removing and installing front silencers", page 339 .](#)
- Secure intermediate steering shaft to steering rack ⇒ Running gear, axles, steering; Rep. gr. 48 ; Steering column; Removing and installing intermediate steering shaft .
- Install upper suspension links and suspension strut ⇒ Running gear, axles, steering; Rep. gr. 40 ; Suspension strut, upper links; Exploded view - suspension strut, upper links .
- Install subframe cross brace and anti-roll bar ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Exploded view - subframe .
- Install brake calipers ⇒ Brake system; Rep. gr. 46 ; Front brakes; Removing and installing brake caliper .
- Install front longitudinal member (bottom) ⇒ General body repairs, exterior; Rep. gr. 50 ; Lock carrier; Exploded view - lock carrier .
- Install engine control unit  
⇒ ["9.1 Removing and installing engine/motor control unit J623", page 334 .](#)

- Install filler neck for washer fluid reservoir ⇒ Electrical system; Rep. gr. 92 ; Windscreen washer system; Exploded view - windscreen washer system .
- Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Install electrical wiring, terminal 30 wiring junction 2 - TV22- and cover for electronics box in engine compartment ⇒ Electrical system; Rep. gr. 97 ; Relay carriers, fuse carriers, electronic boxes; Overview of fitting locations - relay carriers, fuse carriers, electronic boxes .
- Install air conditioner compressor ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching air conditioner compressor at bracket .
- Install poly V-belt  
⇒ ["1.2.2 Removing and installing poly V-belt for ancillaries", page 48](#) .
- Install poly V-belt tensioner for supercharger  
⇒ ["1.3.1 Removing and installing tensioner for poly V-belt for supercharger", page 51](#) .
- Install lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing attachments .
- Install body brace ⇒ Running gear, axles, steering; Rep. gr. 40 ; Suspension strut, upper links; Exploded view - suspension strut, upper links .
- Observe steps required after re-connecting battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .
- Install fuel supply line  
⇒ ["7.3 Removing and installing high-pressure pipe", page 326](#) .
- Install plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .
- Install engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#) .



**Caution**

*Risk of irreparable damage to control units because of excessive voltage.*

◆ *Never use battery charging equipment for boost starting.*

- Fill with engine oil and check oil level ⇒ Maintenance ; Booklet 411 .
- Secure coolant pipes  
⇒ ["3.1 Exploded view - coolant pipes", page 205](#) .
- Connect coolant hoses and connection with plug-in connector  
⇒ [page 223](#) .



**Note**

*Do not reuse coolant.*

- Fill up with coolant ⇒ [page 185](#) .



- Charge refrigerant system ⇒ Air conditioner with refrigerant R134a .
- Align subframe ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Removing and installing subframe with steering rack .
- Install wheel housing liners ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front) .
- Fit front wheels ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .
- Check wheel alignment ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheel alignment check; Wheel alignment procedure .



**WARNING**

*Risk of accident if bolted connections are loose.*

- ◆ *Tighten subframe bolts to final setting after performing wheel alignment check.*

- Fill up with ATF:
  - ◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; ATF
  - ◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; ATF
- Install underbody trim ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody trim; Exploded view - underbody trim .
- Install noise insulation panels ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation .

## 2 Assembly mountings

⇒ ["2.1 Exploded view - assembly mountings", page 37](#)

⇒ ["2.2 Supporting engine in installation position", page 39](#)

⇒ ["2.3 Removing and installing engine mountings", page 40](#)

⇒ ["2.4 Removing and installing gearbox mounting", page 42](#)

### 2.1 Exploded view - assembly mountings

#### Engine mounting

##### 1 - Engine mounting

- ☐ Depending on version, left side may include left electrohydraulic engine mounting solenoid valve - N144-
- ☐ Depending on version, right side may include right electrohydraulic engine mounting solenoid valve - N145-
- ☐ Removing and installing  
⇒ ["2.3 Removing and installing engine mountings", page 40](#)

##### 2 - Bolt

- ☐ 20 Nm

##### 3 - Bracket

- ☐ For engine mounting
- ☐ Renew retaining plate if engine mounting is defective

##### 4 - Bolt

- ☐ 40 Nm

##### 5 - Bolt

- ☐ 20 Nm

##### 6 - Engine support

- ☐ With bracket for air conditioner compressor

##### 7 - Heat shield

##### 8 - Bolt

- ☐ 10 Nm

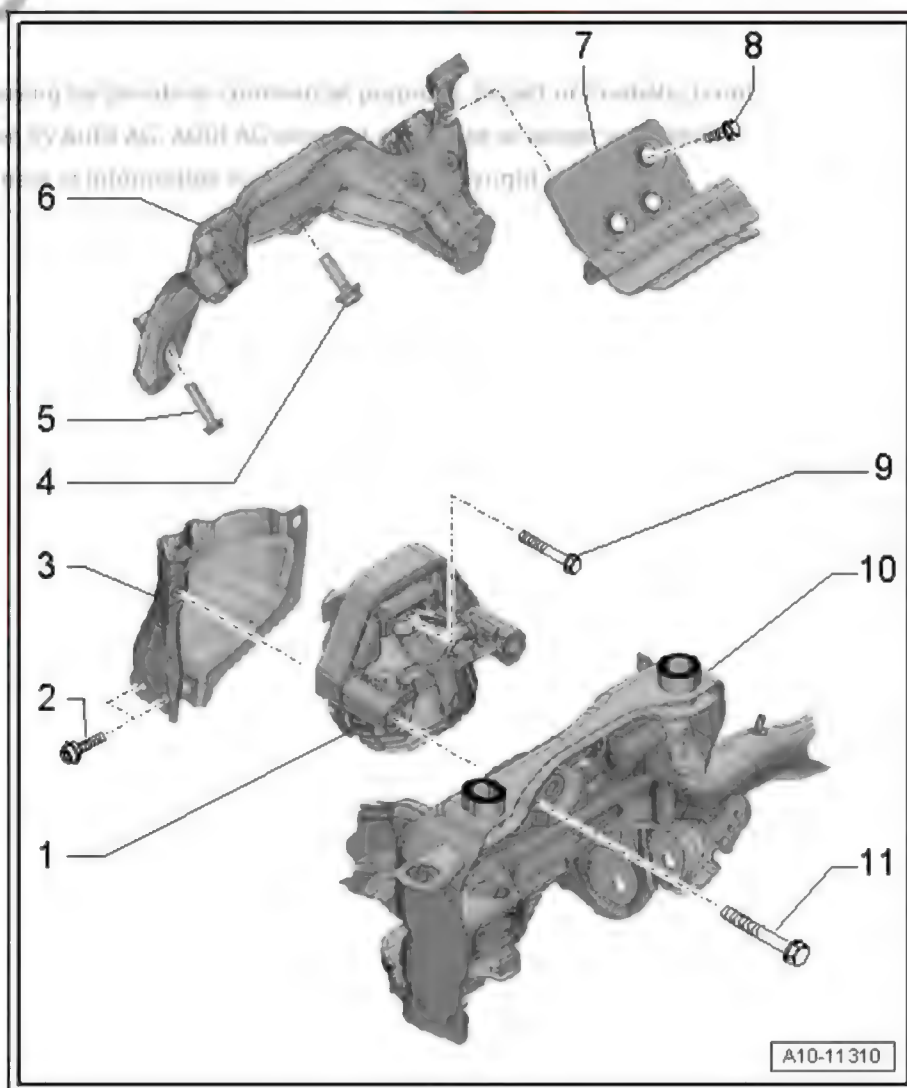
##### 9 - Bolt

- ☐ Renew after removing
- ☐ 90 Nm +90°

##### 10 - Subframe

##### 11 - Bolt

- ☐ 55 Nm



#### Gearbox mounting

# 1 - Bolt

☐ Tightening torque:

◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings

◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings

# 2 - Tunnel cross member

☐ Removing and installing:

◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings

◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings

# 3 - Stop plate

☐ For gearbox mounting

# 4 - Gearbox mounting

☐ Removing and installing ⇒ ["2.4.2 Removing and installing gearbox mounting", page 42](#)

# 5 - Bolt

☐ Tightening torque:

◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings

◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings

# 6 - Nut

☐ Tightening torque:

◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings

◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings

# 7 - Bolt

☐ Tightening torque:

◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings

◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings

# 8 - Gearbox support

☐ Removing and installing ⇒ ["2.4 Removing and installing gearbox mounting", page 42](#)

# 9 - Bolt

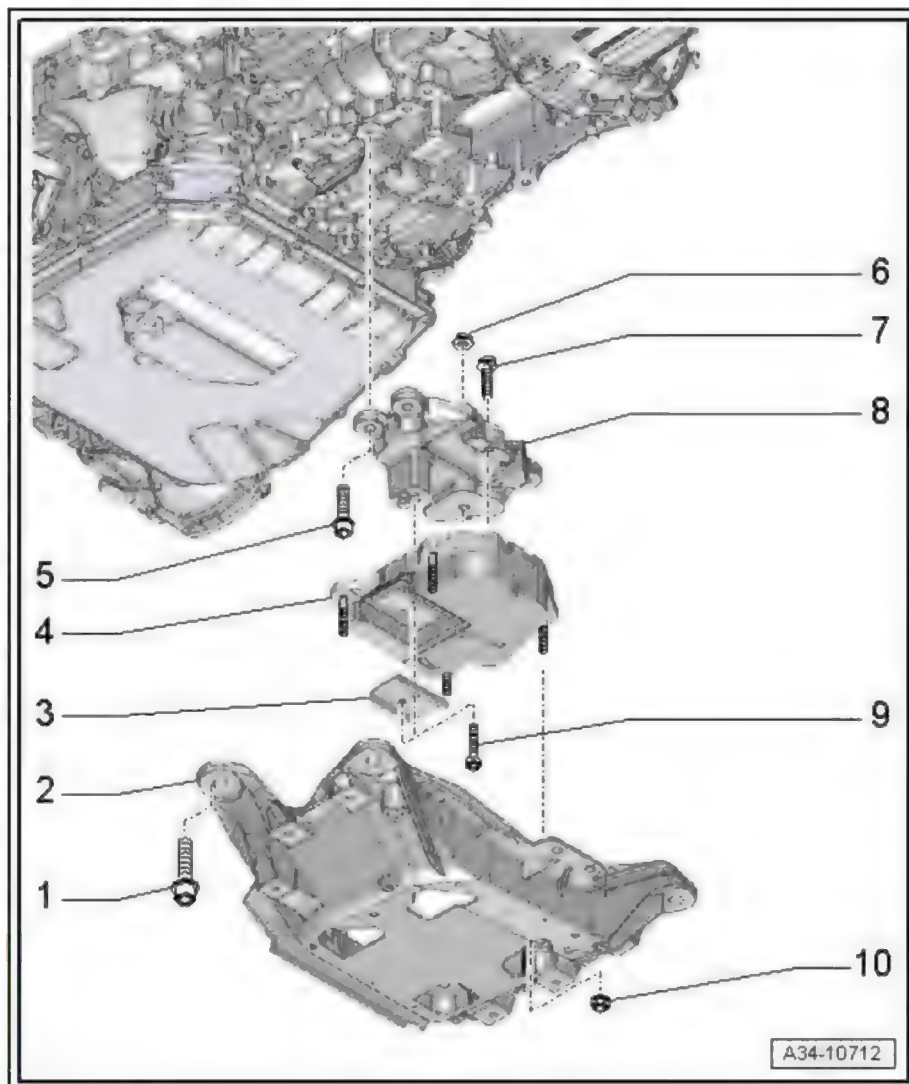
☐ Tightening torque:

◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings

◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings

# 10 - Nut

☐ Tightening torque:



- ◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings
- ◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings

## 2.2 Supporting engine in installation position

Special tools and workshop equipment required

- ◆ Support bracket - 10-222A-



Protected by copyright. Licensed for private use only. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without prior written permission from Audi AG.



### Procedure

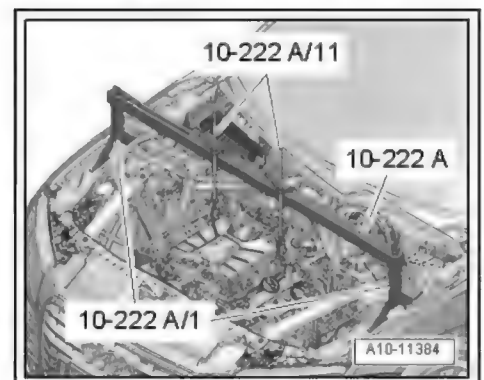
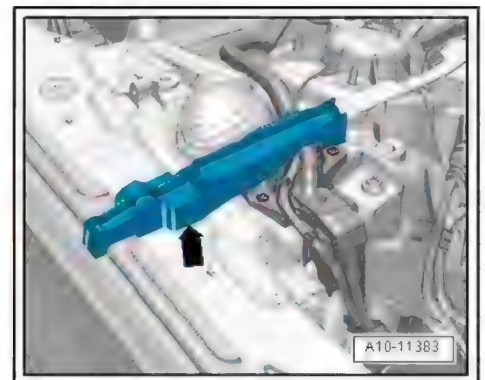


#### WARNING

*Risk of accident when weight of engine is shifted.*

- ◆ *In order to support the engine as described below, the gearbox and tunnel cross members must be installed.*

- Remove engine cover panel  
 ⇒ ["3.1 Removing and installing engine cover panel"](#),  
[page 43](#) .
- Pull off foam wedge -arrow- (left and right) upwards.
- Set up support bracket - 10-222A- on suspension turrets (left and right) as illustrated.
- Engage spindles -10-222A/11- at engine lifting eyes (left and right).
- Partly take up weight of engine with spindles.



## 2.3 Removing and installing engine mountings

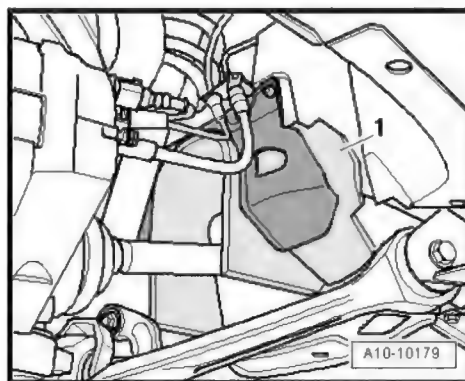


### Note

- ♦ To avoid repeat repairs, proceed as follows if an engine mounting is defective:
- ♦ Renew engine mounting and corresponding bracket.

### Removing

- Support engine in installation position  
⇒ ["2.2 Supporting engine in installation position", page 39](#) .
- Remove noise insulation panels ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Remove relevant front wheel spoiler ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front) .
- Remove corresponding cover -1- for drive shaft in wheel housing.



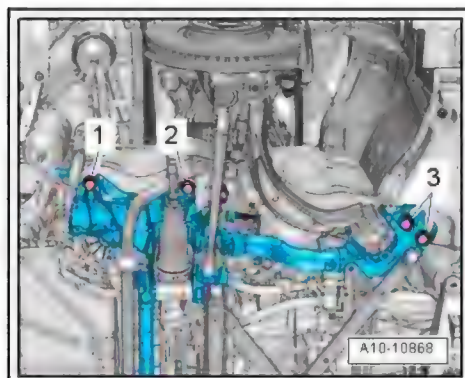
### Engine mounting (left-side):

- Remove bolt -2- for subframe (left-side).



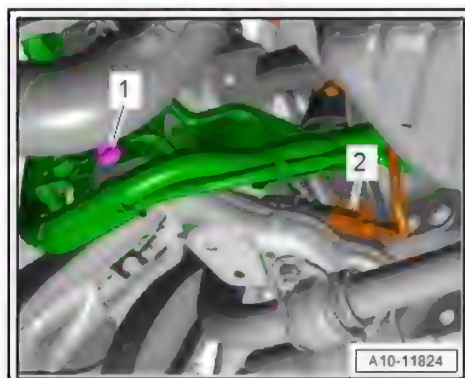
### Note

Bolts -1 and 3- on left side and all bolts for subframe on right side remain fitted.



### Engine mounting (right-side):

- Remove bolt -1-.



Both sides (continued):

- If fitted, take electrical connector -2- for relevant electrohydraulic engine mounting solenoid valve out of bracket and unplug connector.
- Remove bolts -1- and -arrows- and place relevant retaining plate to one side.



Note

*Disregard -item 2-.*

- Using spindle - 10-222A/11- -item 1-, raise engine through distance -a- on corresponding side.
- Distance -a- = approx. 20 mm.
- Detach engine mounting.

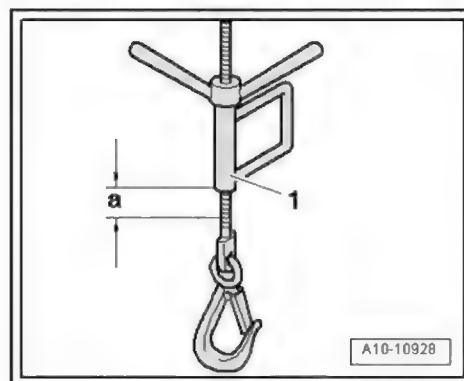
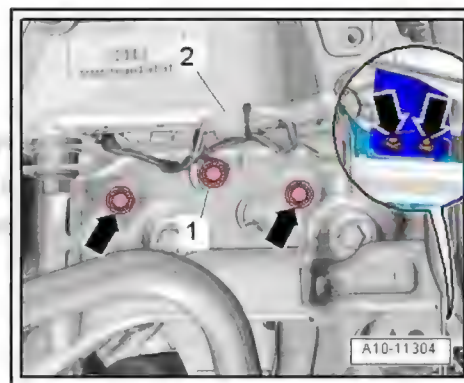
Installing

Installation is carried out in reverse order; note the following:



Note

*Renew bolts tightened with specified tightening angle.*



#### WARNING

*Risk of accident if bolted connections are loose.*

- ◆ *Do NOT drive the vehicle unless the subframe bolts have been tightened to their final torque.*

Tightening torques

- ◆ ⇒ ["2.1 Exploded view - assembly mountings", page 37](#)
- ◆ ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Exploded view - subframe
- ◆ Wheel spoiler ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

## 2.4 Removing and installing gearbox mounting

⇒ ["2.4.1 Removing and installing gearbox support with gearbox mounting", page 42](#)

⇒ ["2.4.2 Removing and installing gearbox mounting", page 42](#)

### 2.4.1 Removing and installing gearbox support with gearbox mounting

#### Removing

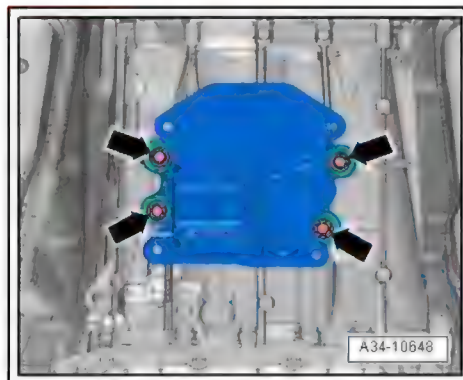
- Remove tunnel cross member:
- ◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings
- ◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings
- Remove bolts -arrows- and detach gearbox support and gearbox mounting from gearbox.

#### Installing

Installation is carried out in reverse sequence.

#### Tightening torques

- ◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings
- ◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings



### 2.4.2 Removing and installing gearbox mounting

#### Removing

- Remove gearbox support with gearbox mounting  
⇒ ["2.4.1 Removing and installing gearbox support with gearbox mounting", page 42](#) .
- Unscrew bolt -1- and detach stop -2- for gearbox mounting.
- Remove nut -4- and bolt -5- and detach gearbox mounting -6- from gearbox support -3-.

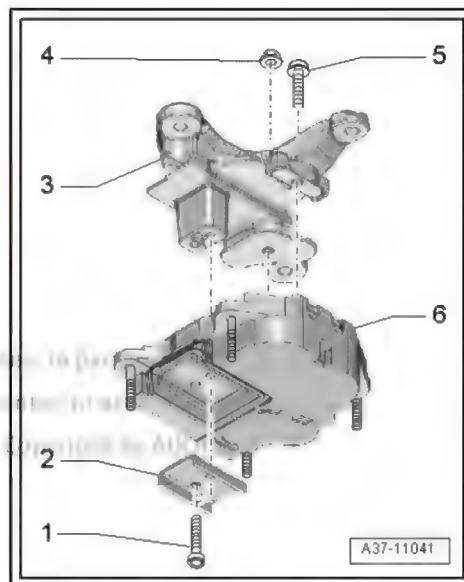
#### Installing

Installation is carried out in reverse order; note the following:

- Position gearbox support -3- on gearbox mounting -6-.
- Hand-tighten nut -4- and bolt -5-.
- Tighten bolt -1- for stop -2-.
- Tighten nut -4- and bolt -5-.
- Install gearbox support with gearbox mounting  
⇒ ["2.4.1 Removing and installing gearbox support with gearbox mounting", page 42](#) .

#### Tightening torques

- ◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings
- ◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings



### 3 Engine cover panel

⇒ "3.1 Removing and installing engine cover panel", page 43

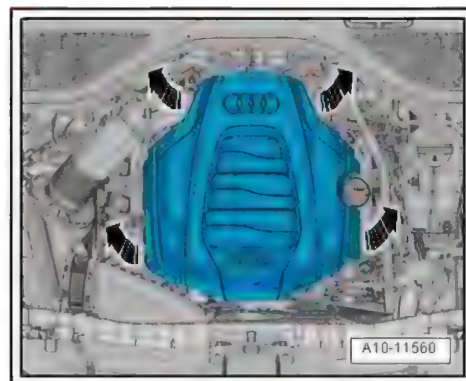
#### 3.1 Removing and installing engine cover panel

##### Removing

- Carefully pull engine cover panel off retaining pins one after another -arrows-. Do not jerk engine cover panel away, and do not try to pull on one side only.

##### Installing

- To avoid damage, do not strike the engine cover panel with your fist or with any kind of tool.
- Position engine cover panel on engine and use both hands to press it down into retaining clips.



Protection des brevets: L'emploi des logos et symboles commerciaux est autorisé dans la mesure où ils sont  
permissiblement utilisés par AUDI AG, AUDI AG (compagnie) ou ses filiales ou sous-traitants.  
L'usage des logos et symboles commerciaux est interdit pour tous les autres utilisateurs.

## 13 – Crankshaft group

### 1 Cylinder block (pulley end)

⇒ ["1.1 Exploded view - poly V-belt drive", page 44](#)

⇒ ["1.2 Removing and installing poly V-belt", page 47](#)

⇒ ["1.3 Removing and installing tensioner for poly V-belt", page 51](#)

⇒ ["1.4 Removing and installing vibration damper", page 53](#)

⇒ ["1.5 Removing and installing sealing flange \(pulley end\)", page 53](#)

### 1.1 Exploded view - poly V-belt drive

⇒ ["1.1.1 Exploded view - poly V-belt drive, poly V-belt for supercharger", page 44](#)

⇒ ["1.1.2 Exploded view - poly V-belt drive, poly V-belt for ancillaries", page 45](#)

#### 1.1.1 Exploded view - poly V-belt drive, poly V-belt for supercharger

##### 1 - Poly V-belt

- ☐ For supercharger
- ☐ Check for wear
- ☐ Removing and installing  
⇒ ["1.2.1 Removing and installing poly V-belt for supercharger", page 47](#)
- ☐ When installing, make sure it is properly seated on pulleys

##### 2 - Bolt

- ☐ Not available separately; combined as a unit with -item 5-
- ☐ 40 Nm
- ☐ 37 Nm if using door alignment tool - 3320-

##### 3 - Washer

- ☐ Not available separately; combined as a unit with -item 5-

##### 4 - Supercharger

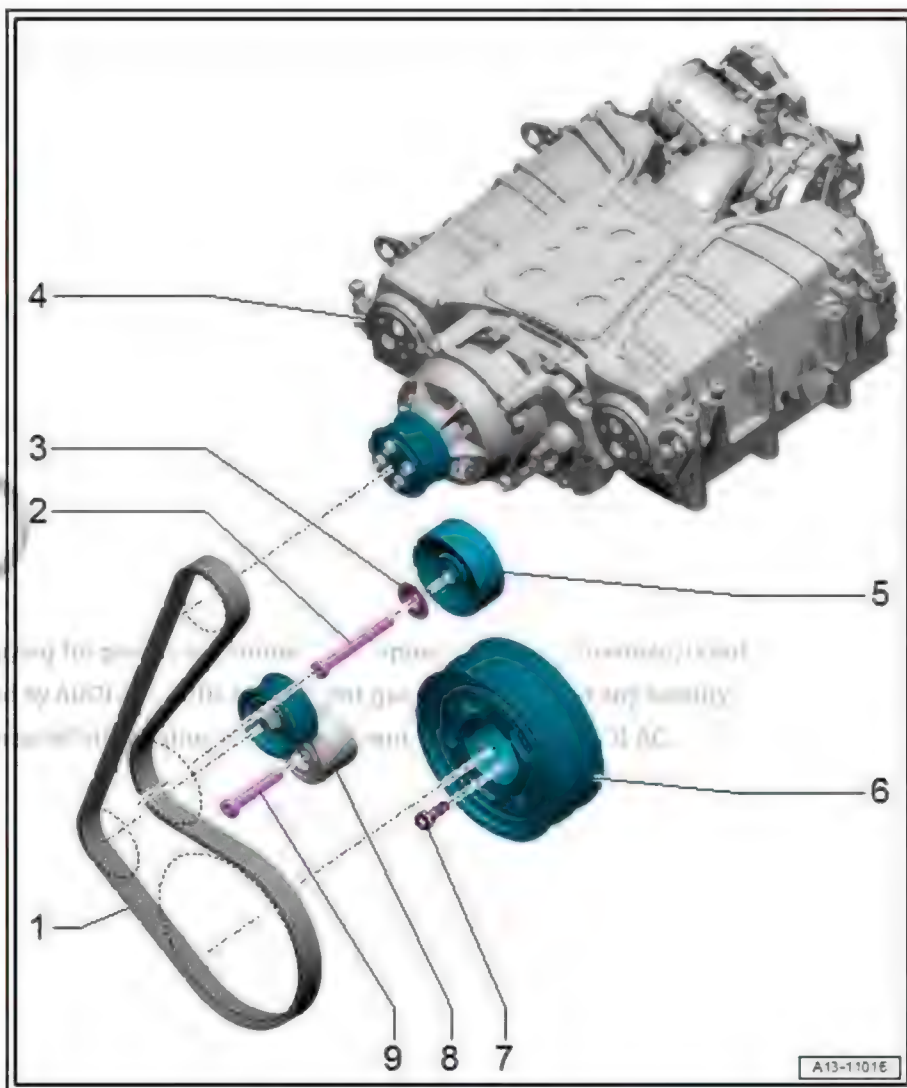
- ☐ Exploded view  
⇒ ["1.1 Exploded view - supercharger", page 239](#)

##### 5 - Idler roller

- ☐ For poly V-belt
- ☐ Combined as a unit with -items 2 and 3-

##### 6 - Vibration damper

- ☐ With poly V-belt pulley



- ☐ Can only be installed in one position (holes are off-set).
- ☐ Removing and installing ⇒ ["1.4 Removing and installing vibration damper", page 53](#)

#### 7 - Bolt

- ☐ Tightening torque ⇒ [Item 1 \(page 45\)](#)

#### 8 - Tensioner

- ☐ For poly V-belt
- ☐ Removing and installing  
⇒ ["1.3.1 Removing and installing tensioner for poly V-belt for supercharger", page 51](#)

#### 9 - Bolt

- ☐ 40 Nm

### 1.1.2 Exploded view - poly V-belt drive, poly V-belt for ancillaries

#### 1 - Bolt

- ☐ Renew after removing
- ☐ 20 Nm +90°

#### 2 - Vibration damper

- ☐ With double-sided poly V-belt pulley
- ☐ Removing and installing  
⇒ ["1.4 Removing and installing vibration damper", page 53](#)

#### 3 - Poly V-belt

- ☐ Check for wear
- ☐ Before removing, mark direction of rotation with chalk or felt-tip pen
- ☐ Removing and installing  
⇒ ["1.2.2 Removing and installing poly V-belt for ancillaries", page 48](#)
- ☐ Do not kink
- ☐ When installing, make sure it is properly seated on pulleys

#### 4 - Cover

- ☐ For idler roller
- ☐ Depending on version

#### 5 - Bolt

- ☐ Tightening torque ⇒  
Electrical system; Rep. gr. 27 ; Alternator; Exploded view - alternator

#### 6 - Alternator

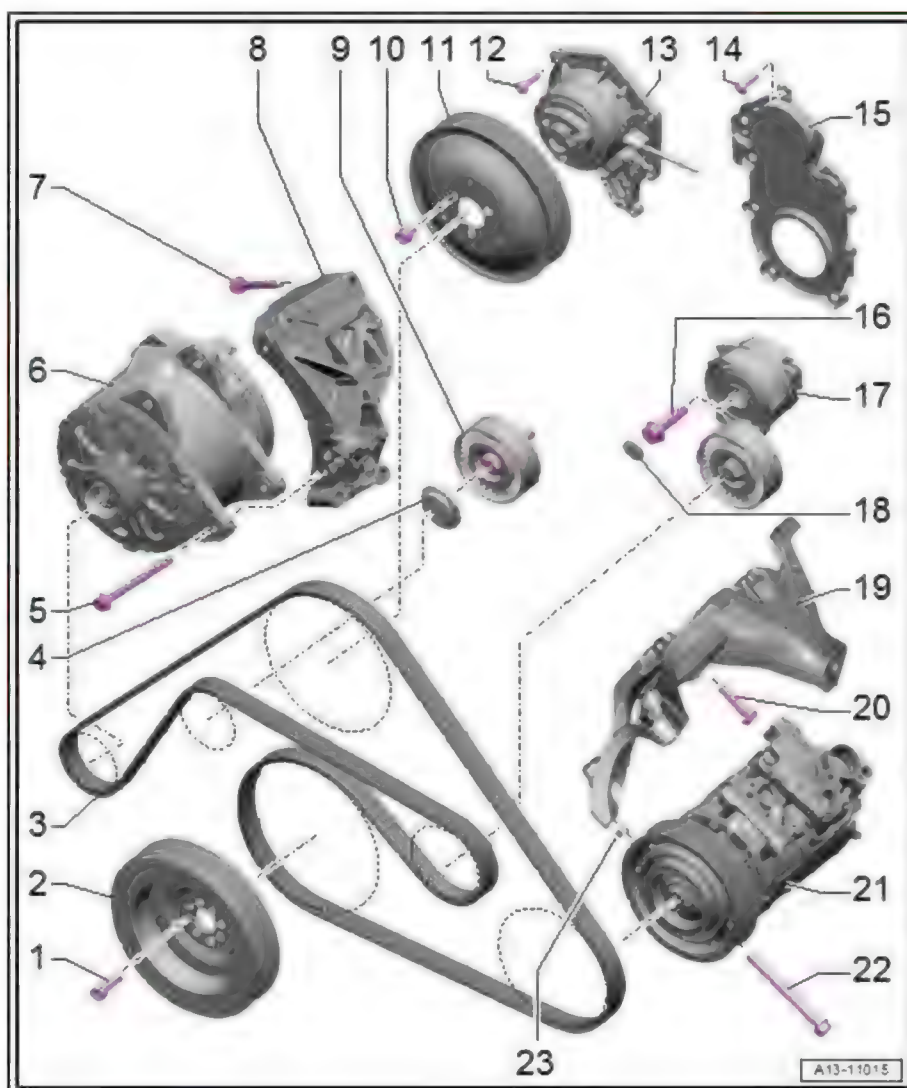
- ☐ Removing and installing  
⇒ Electrical system; Rep. gr. 27 ; Alternator; Removing and installing alternator

#### 7 - Bolt

- ☐ 20 Nm

#### 8 - Bracket

- ☐ For alternator





9 - Idler roller

- ☐ For poly V-belt
- ☐ 40 Nm

10 - Bolt

- ☐ Tightening torque ⇒ [Item 14 \(page 192\)](#)

11 - Poly V-belt pulley

- ☐ For coolant pump
- ☐ Removing and installing ⇒ ["2.5 Removing and installing coolant pump", page 198](#)

12 - Bolt

- ☐ Tightening torque ⇒ [Item 12 \(page 192\)](#)

13 - Coolant pump

- ☐ Removing and installing ⇒ ["2.5 Removing and installing coolant pump", page 198](#)

14 - Bolt

- ☐ Tightening torque and sequence  
⇒ [Fig. "Sealing flange \(pulley end\) - tightening torque and sequence", page 47](#)

15 - Sealing flange (pulley end)

- ☐ Renewing ⇒ ["1.5 Removing and installing sealing flange \(pulley end\)", page 53](#)

16 - Bolt

- ☐ 40 Nm

17 - Tensioner

- ☐ For poly V-belt
- ☐ Removing and installing  
⇒ ["1.3.2 Removing and installing tensioner for poly V-belt for ancillaries", page 51](#)

18 - Cover

- ☐ For tensioner

19 - Engine support (left-side)

- ☐ With bracket for air conditioner compressor

20 - Bolt

- ☐ Tightening torque ⇒ [Item 4 \(page 37\)](#)

21 - Air conditioner compressor

- ☐ Do not unscrew or disconnect refrigerant hoses or pipes.
- ☐ Removing and installing ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching air conditioner compressor at bracket

22 - Bolt

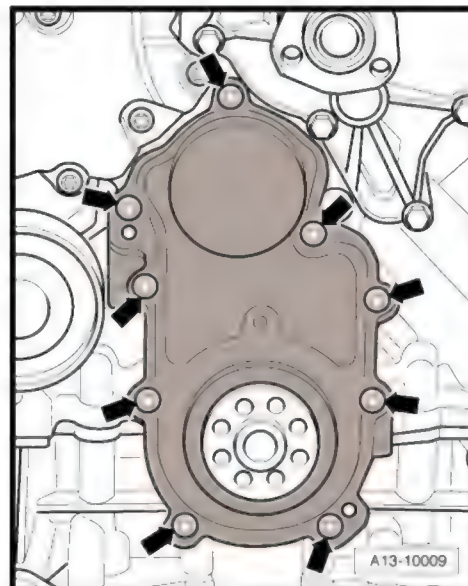
- ☐ Tightening torque ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Exploded view - air conditioner compressor drive unit

23 - Dowel sleeve

- ☐ 2x

#### Sealing flange (pulley end) - tightening torque and sequence

- Tighten bolts -arrows- in stages and in diagonal sequence; final torque 9 Nm.



## 1.2 Removing and installing poly V-belt

⇒ ["1.2.1 Removing and installing poly V-belt for supercharger", page 47](#)

⇒ ["1.2.2 Removing and installing poly V-belt for ancillaries", page 48](#)

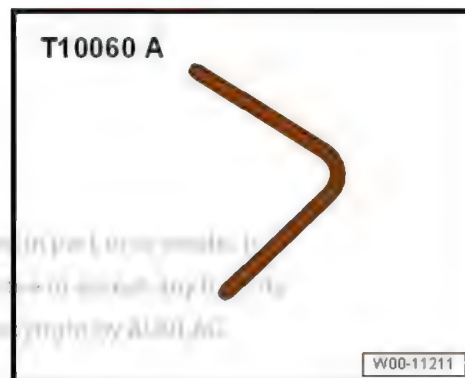
### 1.2.1 Removing and installing poly V-belt for supercharger

Special tools and workshop equipment required

- ◆ Locking pin - T10060A-



Protected by copyright. Copying for private or commercial purposes (in part or complete) is prohibited unless authorized by AUDI AG. AUDI AG does not guarantee any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



#### Removing



#### WARNING

*Risk of injury as the radiator fans may start up automatically.*

- ◆ *Even when the ignition is switched off, the radiator fans can start up without warning due to accumulated heat in the engine compartment, etc.*

- Remove engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#).
- Remove noise insulation (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .

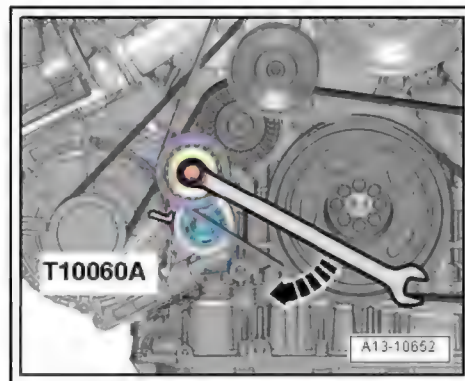


### Caution

Wrong direction of rotation for a used poly V-belt can lead to irreparable damage.

- ◆ Before removing the poly V-belt mark the direction of rotation with chalk or a felt-tip pen for re-installation.

- To slacken poly V-belt, turn tensioner in clockwise direction -arrow-.
- Detach poly V-belt and lock tensioner with locking pin - T10060 A- .

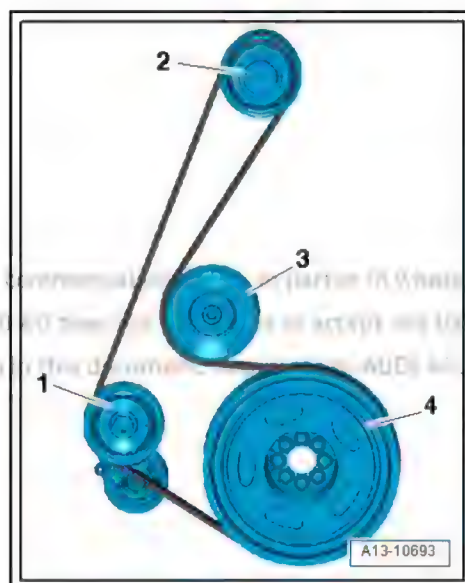
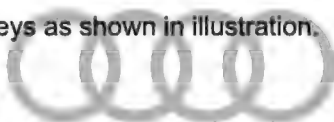


### Installing

Installation is carried out in reverse order; note the following:

- Fit poly V-belt on pulleys as shown in illustration.

- 1 - Tensioner
  - 2 - Supercharger
  - 3 - Idler roller
  - 4 - Vibration damper
- Fit poly V-belt onto idler roller -3- last.



### Note

When installing poly V-belt, make sure it is properly seated on pulleys.

- Start engine and check that poly V-belt(s) run properly.
- Install engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#) .

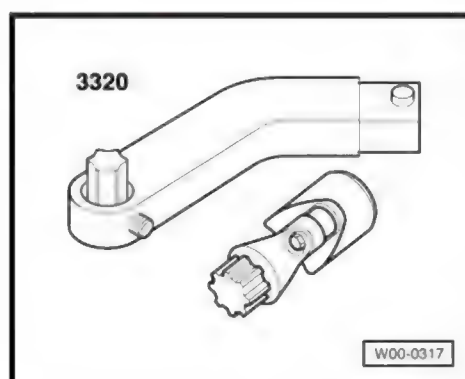
### Tightening torques

- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

## 1.2.2 Removing and installing poly V-belt for ancillaries

### Special tools and workshop equipment required

- ◆ Special wrench, long reach -3320/2- (included with door alignment tool - 3320- )



◆ Locking pin - T10060A-

Protected by copyright. Copying for personal or commercial purposes, in part or in whole, is permitted unless authorised by AUDI AG. AUDI AG does not guarantee the accuracy of the information with respect to the correctness of information in this document. Copyright by AUDI



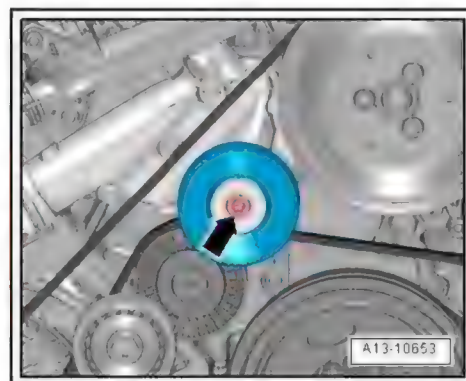
Removing

- Remove poly V-belt for supercharger  
⇒ "1.2.1 Removing and installing poly V-belt for supercharger",  
page 47 .
- Remove bolt -arrow- using special wrench, long reach  
-3320/2- .
- Push guide roller towards radiator cowl.



Note

*The guide roller cannot be detached.*

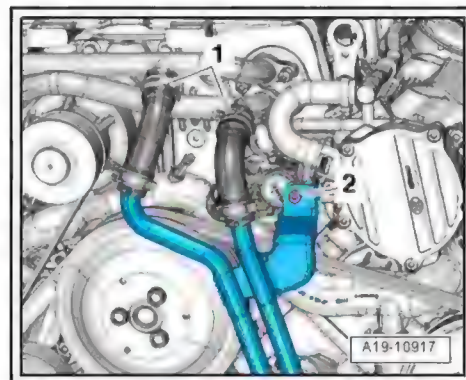


- Remove bolt -2- for coolant pipes (front left).



Note

- ◆ For illustration purposes, the installation position is shown with  
the engine removed.
- ◆ Disregard -item 1-.

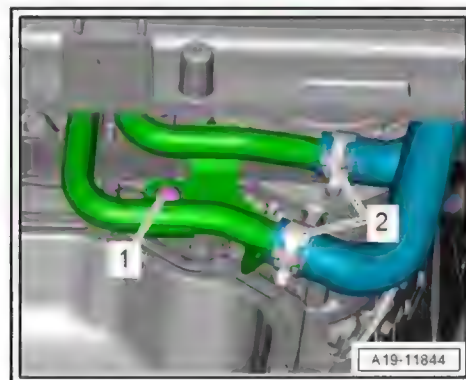


- Remove bolt -1- for coolant pipes (front left).



Note

*Disregard -item 2-.*



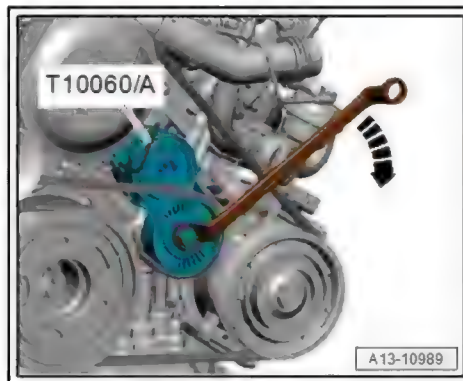


### Caution

*Wrong direction of rotation for a used poly V-belt can lead to irreparable damage.*

- ◆ *Before removing the poly V-belt mark the direction of rotation with chalk or a felt-tip pen for re-installation.*

- To slacken poly V-belt, turn tensioner clockwise -arrow- and lock with locking pin - T10060 A- .
- Take off poly V-belt.

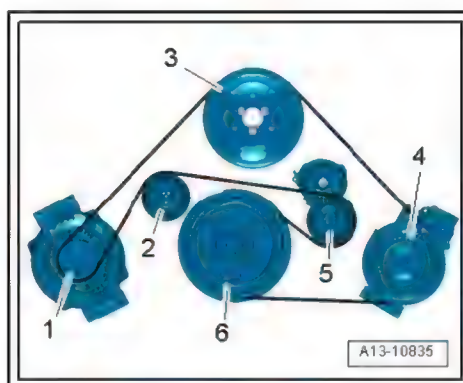


### Installing

Installation is carried out in reverse order; note the following:

- Fit poly V-belt on pulleys as shown in illustration.

- 1 - Alternator
- 2 - Idler roller
- 3 - Coolant pump
- 4 - Air conditioner compressor
- 5 - Tensioner for poly V-belt
- 6 - Vibration damper



### Note

*When installing poly V-belt, make sure it is properly seated on pulleys.*

- Start engine and check that poly V-belt(s) run properly.
- Install poly V-belt for supercharger  
⇒ ["1.2.1 Removing and installing poly V-belt for supercharger", page 47](#) .

### Tightening torques

- ◆ ⇒ ["1.1.2 Exploded view - poly V-belt drive, poly V-belt for ancillaries", page 45](#)
- ◆ ⇒ ["3.1 Exploded view - coolant pipes", page 205](#)



*This document is a copyright of Audi AG. It is not to be reproduced or transmitted in any form or by any means electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without prior written permission from Audi AG.*

## 1.3 Removing and installing tensioner for poly V-belt

⇒ "1.3.1 Removing and installing tensioner for poly V-belt for supercharger", page 51

⇒ "1.3.2 Removing and installing tensioner for poly V-belt for ancillaries", page 51

### 1.3.1 Removing and installing tensioner for poly V-belt for supercharger

#### Removing

- Remove poly V-belt for supercharger  
⇒ "1.2.1 Removing and installing poly V-belt for supercharger", page 47 .
- Remove bolt -1- and detach poly V-belt tensioner -2-.



#### Note

Ignore -T10060A- .

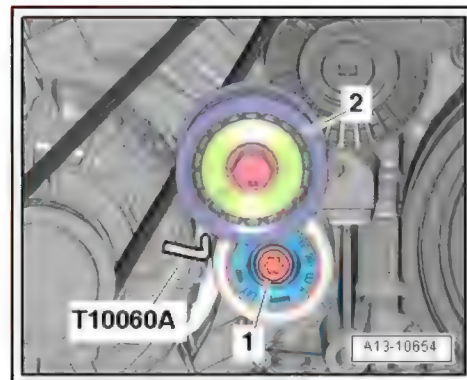
#### Installing

Installation is carried out in reverse order; note the following:

- Install poly V-belt for supercharger  
⇒ "1.2.1 Removing and installing poly V-belt for supercharger", page 47 .

#### Tightening torques

- ◆ ⇒ "1.1.1 Exploded view - poly V-belt drive, poly V-belt for supercharger", page 44



### 1.3.2 Removing and installing tensioner for poly V-belt for ancillaries

#### Removing



#### WARNING

*Risk of injury as the radiator fans may start up automatically.*

- ◆ *Even when the ignition is switched off, the radiator fans can start up without warning due to accumulated heat in the engine compartment, etc.*

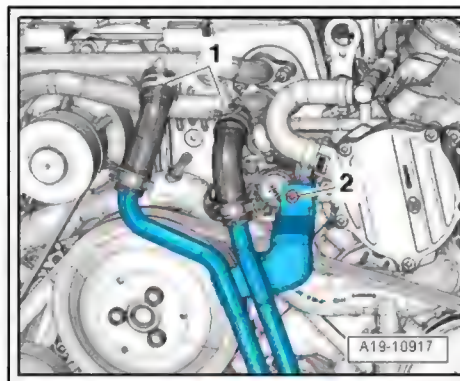
- Remove engine cover panel  
⇒ "3.1 Removing and installing engine cover panel", page 43 .

- Remove bolt -2- for coolant pipes (front left).



Note

Disregard -item 1-.

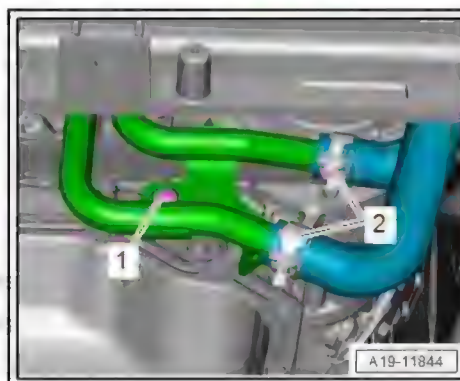


- Remove bolt -1- for coolant pipes (front left).



Note

Disregard -item 2-.

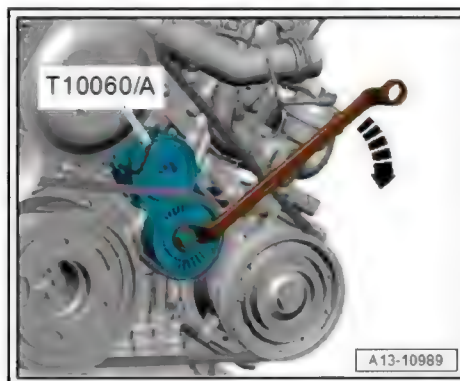


- To slacken poly V-belt, turn tensioner in clockwise direction -arrow-.
- Remove poly V-belt from tensioner and release tensioner.



Note

Ignore -T10060A- .



- Remove bolt -1- and detach poly V-belt tensioner -2- from cylinder block.

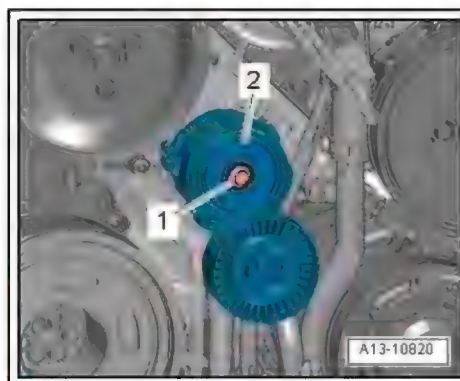
#### Installing

Installation is carried out in reverse order; note the following:

- Install poly V-belt  
⇒ ["1.2.2 Removing and installing poly V-belt for ancillaries", page 48](#) .
- Install engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#) .

#### Tightening torques

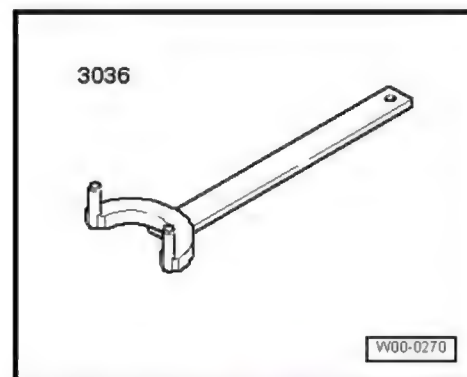
- ◆ ⇒ ["1.1.2 Exploded view - poly V-belt drive, poly V-belt for ancillaries", page 45](#)
- ◆ ⇒ ["3.1 Exploded view - coolant pipes", page 205](#)



## 1.4 Removing and installing vibration damper

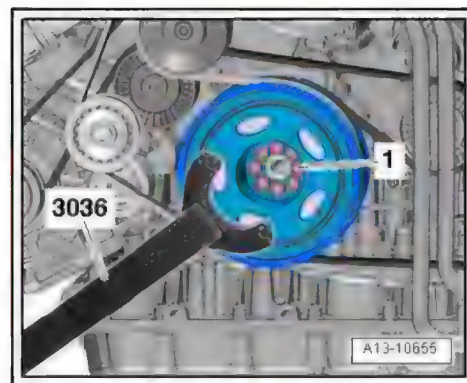
Special tools and workshop equipment required

- ◆ Counterhold tool - 3036-



### Removing

- Remove poly V-belt for supercharger  
⇒ ["1.2.1 Removing and installing poly V-belt for supercharger", page 47](#) .
- Remove poly V-belt from tensioner and release tensioner  
⇒ ["1.3.2 Removing and installing tensioner for poly V-belt for ancillaries", page 51](#) .
- Loosen bolts -1- for vibration damper using counterhold tool - 3036- .
- Remove bolts and take off vibration damper.



### Installing

Installation is carried out in reverse order; note the following:



#### Note

- ◆ *Renew bolts tightened with specified tightening angle.*
- ◆ *Can only be installed in one position.*
- Observe dowel sleeve when installing vibration damper.
- Install poly V-belt  
⇒ ["1.2.2 Removing and installing poly V-belt for ancillaries", page 48](#) .

### Tightening torques

- ◆ ⇒ ["1.1.2 Exploded view - poly V-belt drive, poly V-belt for ancillaries", page 45](#)

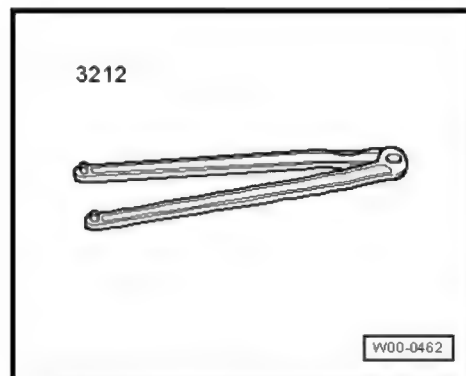
## 1.5

## Removing and installing sealing flange (pulley end)

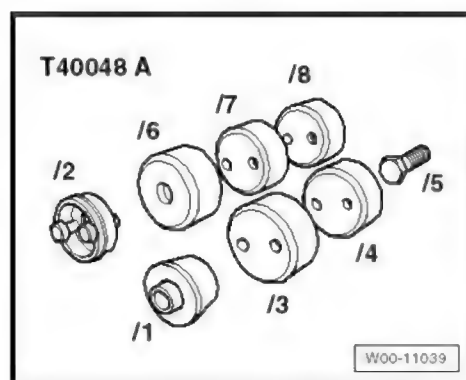
Special tools and workshop equipment required



◆ Pin wrench - 3212-



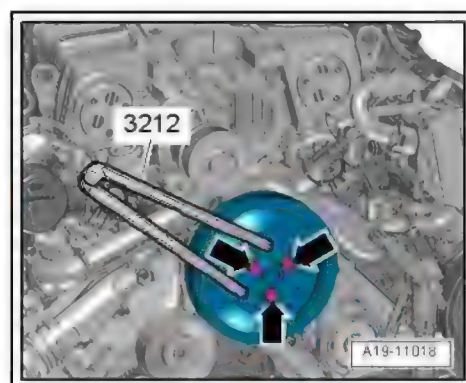
◆ Assembly tool - T40048 A-



- ◆ Electric drill with plastic brush
- ◆ Safety goggles
- ◆ Sealant ⇒ Electronic parts catalogue

Procedure

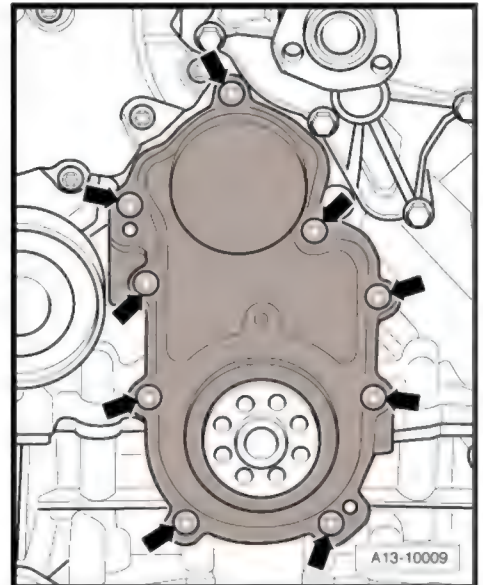
- Remove vibration damper  
⇒ ["1.4 Removing and installing vibration damper", page 53](#).
- Loosen bolts -arrows- for coolant pump pulley (counterhold with pin wrench - 3212- ).
- Remove bolts and take off poly V-belt pulley.



- Loosen bolts -arrows- in diagonal sequence and remove.
- Release sealing flange (pulley end) from bonded joint and take off sealing flange.



*Renew sealing flange (pulley end) after removing.*



#### Caution

*Protect lubrication system against contamination.*

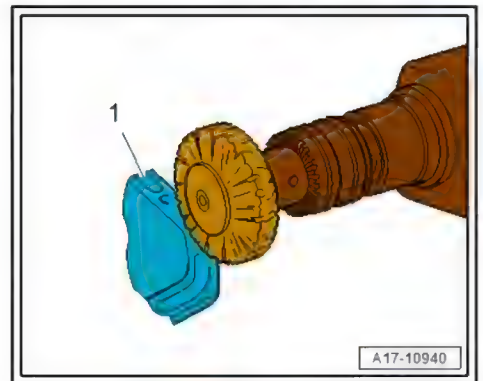
- ◆ *Cover exposed parts of the engine.*



#### WARNING

*Risk of eye injury.*

- ◆ *Put on safety goggles.*

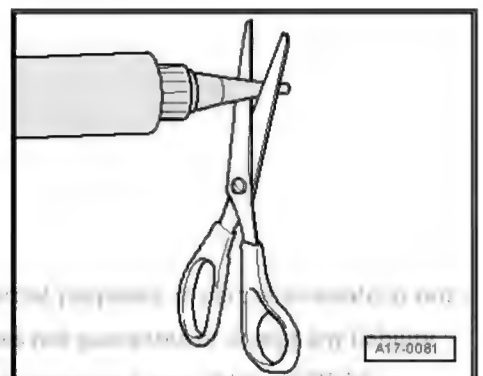


- Remove sealant residue from cylinder block and sump (top section) -1- using rotating plastic brush or similar.
- Clean surfaces; they must be free of oil and grease.



*Note the use-by date of the sealant.*

- Cut off nozzle of tube at front marking (nozzle Ø approx. 1.5 mm).





### Caution

*Make sure lubrication system is not clogged by excess sealant.*

- ◆ *The sealant bead must not be thicker than specified.*

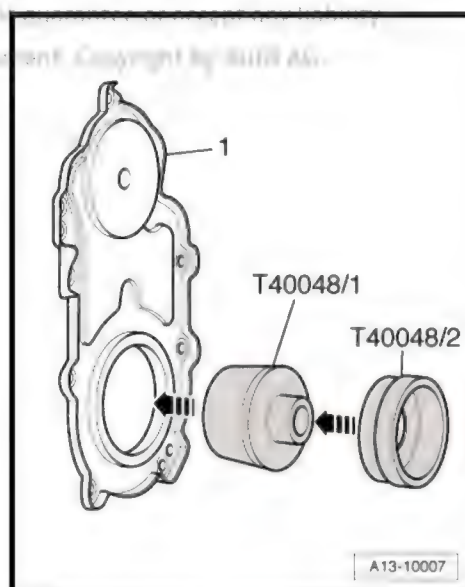
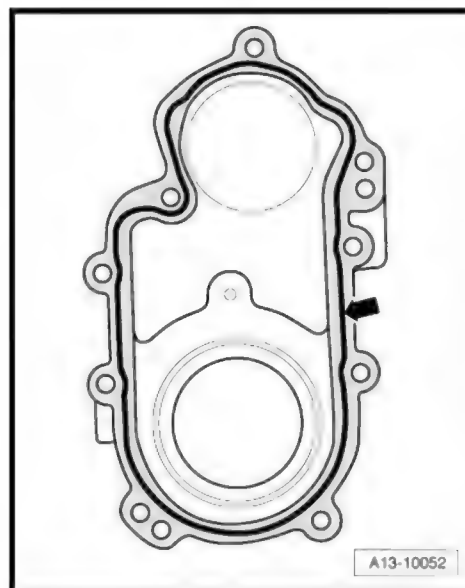
- Apply bead of sealant -arrow- onto sealing surface of new sealing flange (pulley end) as shown in illustration.
- The groove on the sealing surface must be completely filled with sealant.
- The bead of sealant must project 1.5 ... 2.0 mm above the sealing surface.



### Note

*The sealing flange (pulley end) must be installed within 5 minutes after applying the sealant.*

- Fit assembly aid -T40048/1- onto assembly sleeve -T40048/2- and slide sealing flange -1- onto assembly sleeve.
- Detach assembly aid.



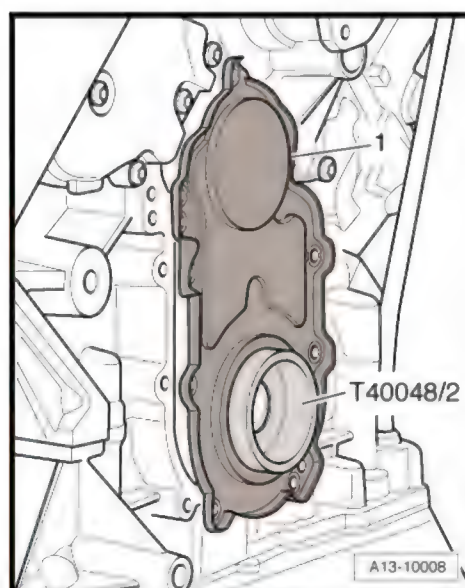
- First position sealing flange -1- (with assembly sleeve -T40048/2- inserted) on crankshaft.
- Keep sealing flange straight while pushing it onto engine sealing surface. Then bolt on  
⇒ [Fig. "Sealing flange \(pulley end\) - tightening torque and sequence", page 47](#).

Remaining installation steps are carried out in reverse sequence; note the following:

- Install vibration damper  
⇒ ["1.4 Removing and installing vibration damper", page 53](#).

### Tightening torques

- ◆ ⇒ [Fig. "Sealing flange \(pulley end\) - tightening torque and sequence", page 47](#)
- ◆ ⇒ ["2.1 Exploded view - coolant pump/thermostat", page 191](#)



## 2 Cylinder block (gearbox end)

⇒ ["2.1 Exploded view - cylinder block \(gearbox end\)", page 57](#)

⇒ ["2.2 Removing and installing drive plate", page 57](#)

⇒ ["3.5 Removing and installing sender wheel", page 66](#)

### 2.1 Exploded view - cylinder block (gearbox end)



#### Note

*When performing assembly work, secure engine to engine and gearbox support - VAS 6095-  
⇒ ["1.3 Securing engine to engine and gearbox support", page 28](#).*

#### 1 - Bolt

- ☐ Renew after removing
- ☐ 60 Nm +90°

#### 2 - Drive plate

- ☐ With bearing flange
- ☐ Check running surface on bearing flange and holes for torque converter for cracks and scoring
- ☐ Removing and installing  
⇒ ["2.2 Removing and installing drive plate", page 57](#)

#### 3 - Sender wheel

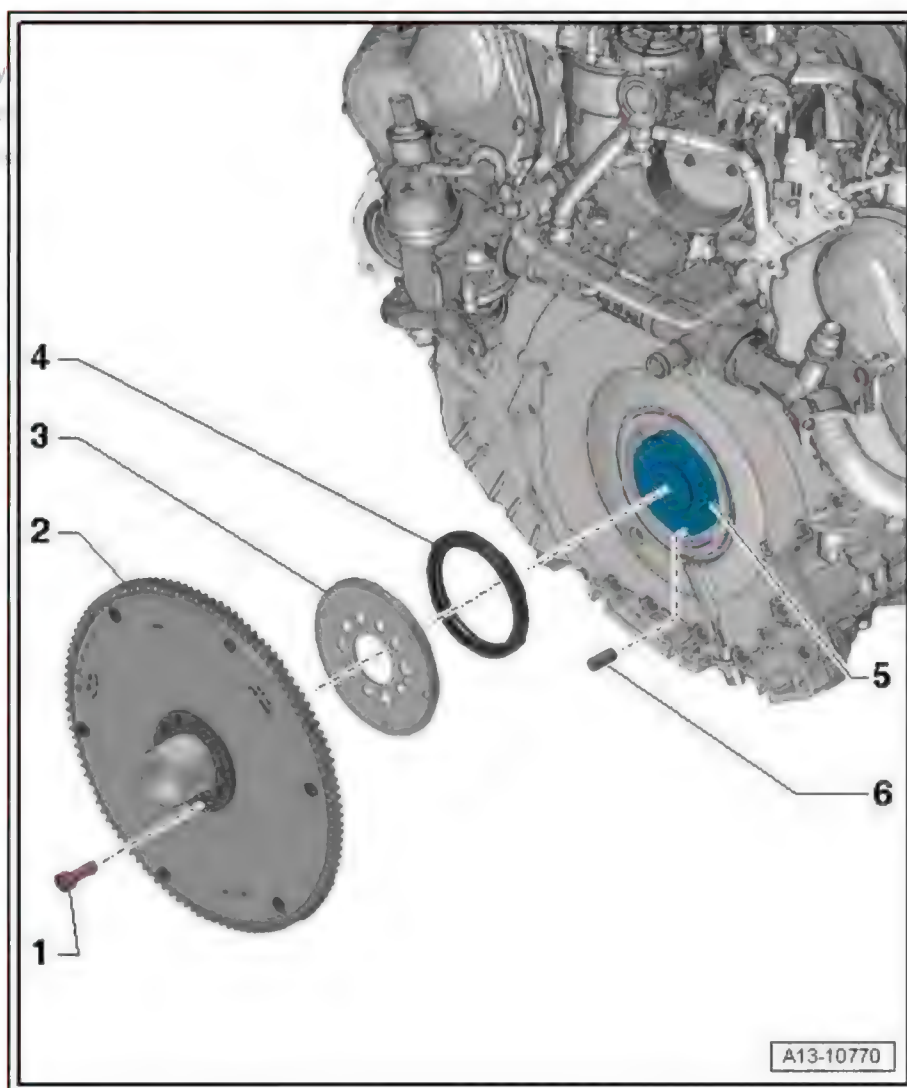
- ☐ For engine speed sender - G28-
- ☐ Removing and installing  
⇒ ["3.5 Removing and installing sender wheel", page 66](#)
- ☐ Checking  
⇒ ["3.6 Checking sender wheel", page 67](#)

#### 4 - Oil seal

- ☐ For crankshaft (gearbox end)
- ☐ Renewing  
⇒ ["2.3 Renewing crankshaft oil seal \(gearbox end\)", page 58](#)

#### 5 - Crankshaft

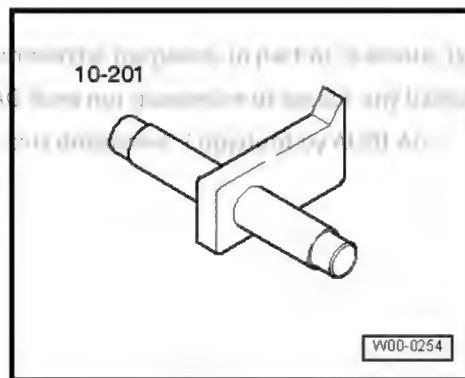
#### 6 - Dowel pin



### 2.2 Removing and installing drive plate

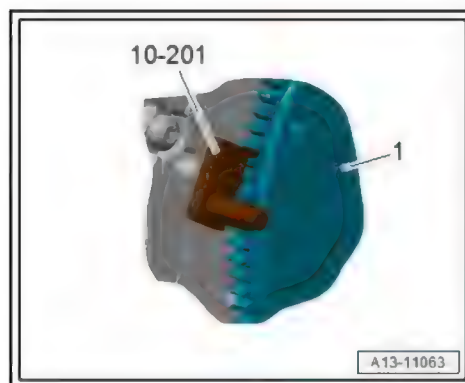
Special tools and workshop equipment required

#### ◆ Counterhold tool - 10-201-



#### Removing

- Gearbox removed:
- ◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Removing and installing gearbox
- ◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Removing and installing gearbox
- Insert counterhold tool - 10-201- to slacken bolts.



#### Caution

*Take care not to damage outer surface of bearing flange on drive plate.*

- ◆ *Use a multi-point socket bit with a length of at least 40 mm to slacken and tighten the drive plate bolts.*

- Remove bolts and take off drive plate and sender wheel.

#### Installing

Installation is carried out in reverse order; note the following:



#### Note

*Renew bolts tightened with specified tightening angle.*

- Pay attention to dowel pin when installing drive plate.
- Fit counterhold tool - 10-201- the other way round to tighten bolts.

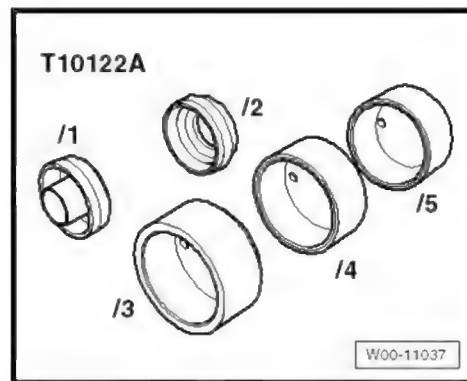
#### Tightening torques

- ◆ ⇒ ["2.1 Exploded view - cylinder block \(gearbox end\)", page 57](#)

## 2.3 Renewing crankshaft oil seal (gearbox end)

Special tools and workshop equipment required

◆ Fitting tool - T10122 A-



◆ Guide piece - T10122/6-

◆ Extractor tool - T20143/2-



#### Procedure

• Gearbox removed:

◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Removing and installing gearbox

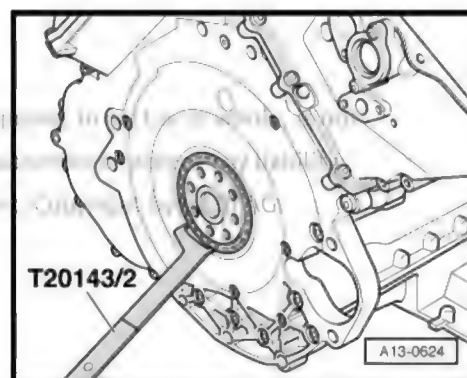
◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Removing and installing gearbox

– Remove drive plate

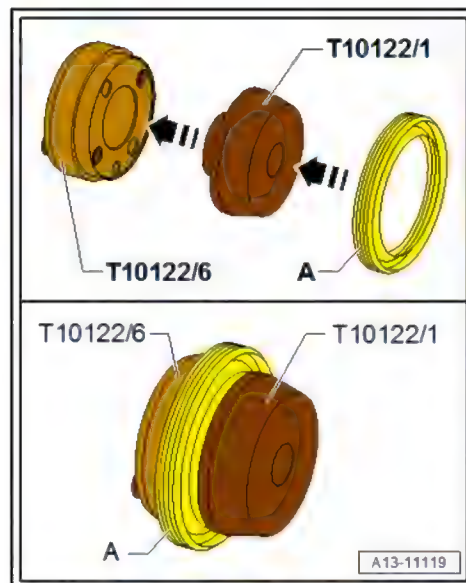
⇒ ["2.2 Removing and installing drive plate", page 57](#) .

– Pry out oil seal using extractor hook -T20143/2- .

– Clean contact surface and sealing surface.



- Fit assembly aid -T10122/1- onto guide piece - T10122/6- and slide oil seal -A- onto guide piece.
- Detach assembly aid -T10122/1- .



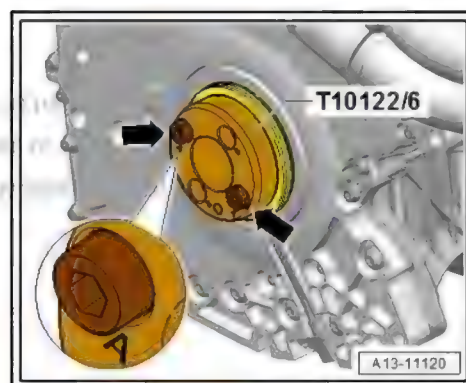
- Fit guide piece - T10122/6- onto crankshaft.
- Bolt guide piece to crankshaft through securing points -A- using bolts -arrows-.



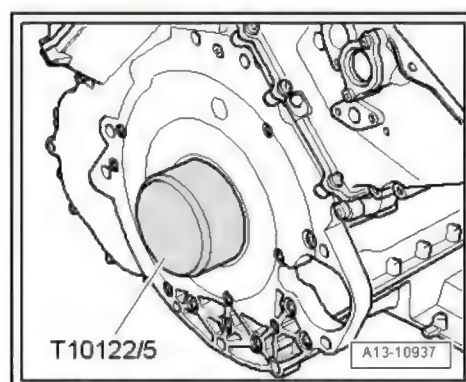
#### Caution

*Risk of leaks if installed incorrectly.*

- ◆ *Slide oil seal onto crankshaft by hand to prevent sealing lip on oil seal from folding over.*



- Slide oil seal over guide piece - T10122/6- onto crankshaft by hand.
- Press in oil seal evenly all round using thrust piece - T10122/5- .
- Remove guide piece - T10122/6- .
- Check that oil seal and its sealing lip are correctly seated. If sealing lip is partially folded over, repeat procedure with a new oil seal.
- Install drive plate  
⇒ ["2.2 Removing and installing drive plate", page 57](#) .



### 3 Crankshaft

⇒ ["3.1 Exploded view - crankshaft", page 61](#)

⇒ ["3.2 Crankshaft dimensions", page 65](#)

⇒ ["3.3 Measuring axial clearance of crankshaft", page 65](#)

⇒ ["3.4 Measuring radial clearance of crankshaft", page 65](#)

⇒ ["3.5 Removing and installing sender wheel", page 66](#)

⇒ ["3.6 Checking sender wheel", page 67](#)

#### 3.1 Exploded view - crankshaft



Note

*When performing assembly work, secure engine to engine and gearbox support - VAS 6095-  
⇒ ["1.3 Securing engine to engine and gearbox support", page 28](#).*

##### 1 - Sealing flange (pulley end)

- ☐ Renewing

⇒ ["1.5 Removing and installing sealing flange \(pulley end\)", page 53](#)

##### 2 - Bolt

- ☐ Tightening torque and sequence

⇒ [Fig. "Sealing flange \(pulley end\) - tightening torque and sequence", page 47](#)

##### 3 - Crankshaft

- ☐ Measuring axial clearance

⇒ ["3.3 Measuring axial clearance of crankshaft", page 65](#)

- ☐ Measuring radial clearance

⇒ ["3.4 Measuring radial clearance of crankshaft", page 65](#)

- ☐ Crankshaft dimensions

⇒ ["3.2 Crankshaft dimensions", page 65](#)

##### 4 - Dowel sleeve

- ☐ 4x

- ☐ Inserting in retaining frame

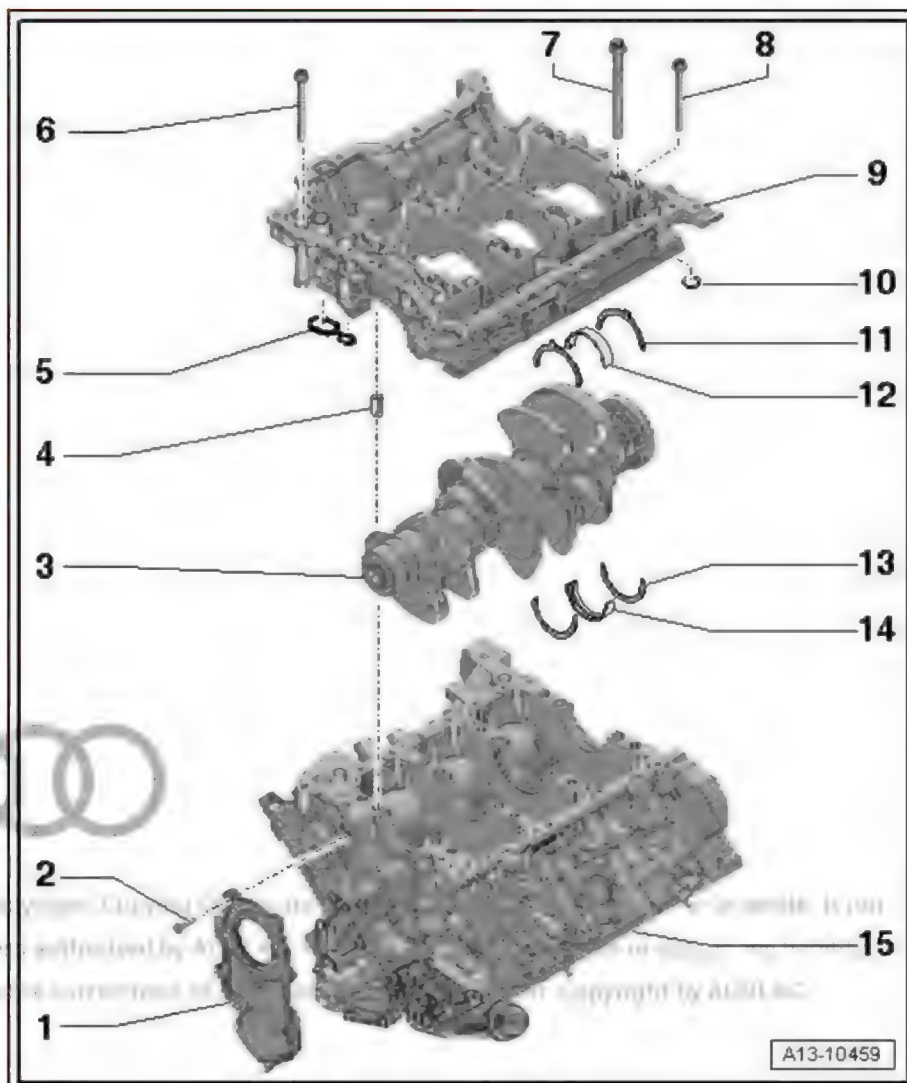
⇒ [Fig. "Applying sealant to retaining frame, position of dowel sleeves", page 63](#)

##### 5 - Seal

- ☐ Renew after removing

##### 6 - Bolt

- ☐ For sealing surfaces: retaining frame to cylinder block





- ☐ Differing bolt lengths and bolt heads
- ☐ Tightening torque and sequence ⇒ [Fig. ""Installing retaining frame"" , page 64](#)

#### 7 - Bolt

- ☐ Long, large collar
- ☐ For retaining frame (inner row)
- ☐ Renew after removing
- ☐ Use old bolts when measuring radial clearance
- ☐ Tightening torque and sequence ⇒ [Fig. ""Installing retaining frame"" , page 64](#)

#### 8 - Bolt

- ☐ Short, small collar
- ☐ For retaining frame (outer row)
- ☐ Tightening torque and sequence ⇒ [Fig. ""Installing retaining frame"" , page 64](#)

#### 9 - Retaining frame

- ☐ With valve for oil pressure control - N428- ⇒ [Fig. "" Valve for oil pressure control -N428- "" , page 63](#)
- ☐ To remove, detach guide rail ⇒ [Item 1 \(page 96\)](#) for drive chain for valve gear
- ☐ Applying sealant ⇒ [Fig. ""Applying sealant to retaining frame, position of dowel sleeves"" , page 63](#)
- ☐ Removing and installing valve for oil pressure control - N428-  
⇒ ["4.6 Removing and installing valve for oil pressure control N428 " , page 176](#)

#### 10 - Seal

- ☐ Renew after removing

#### 11 - Thrust washer

- ☐ Only fitted on 3rd crankshaft bearing
- ☐ Installation position: oil groove faces outwards
- ☐ Make sure it engages in retaining frame

#### 12 - Bearing shell

- ☐ For retaining frame (without oil groove)
- ☐ Renew used bearing shells
- ☐ Note installation position
- ☐ Install new bearing shells for retaining frame with correct coloured markings  
⇒ [Fig. ""Matching crankshaft bearing shells to bearings in retaining frame"" , page 64](#)

#### 13 - Thrust washer

- ☐ Only fitted on 3rd crankshaft bearing
- ☐ Installation position: oil groove faces outwards
- ☐ Make sure it engages in cylinder block

#### 14 - Bearing shell

- ☐ For cylinder block (with oil groove)
- ☐ Renew used bearing shells
- ☐ Note installation position
- ☐ Install new bearing shells for the cylinder block with the correct coloured markings  
⇒ [Fig. ""Matching crankshaft bearing shells to bearings in cylinder block"" , page 64](#)

#### 15 - Cylinder block

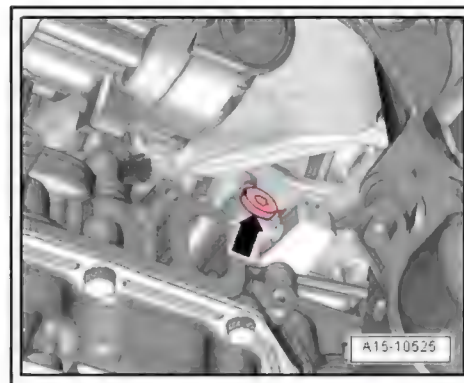
Plug for "TDC" marking - tightening torque



Note

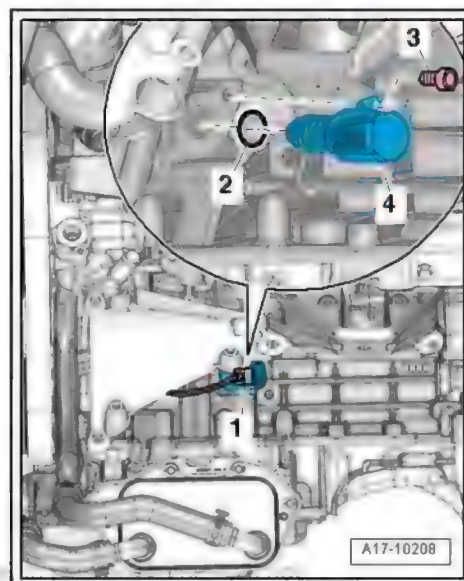
*Renew O-ring after removal.*

- Tighten plug -arrow- to 14 Nm.



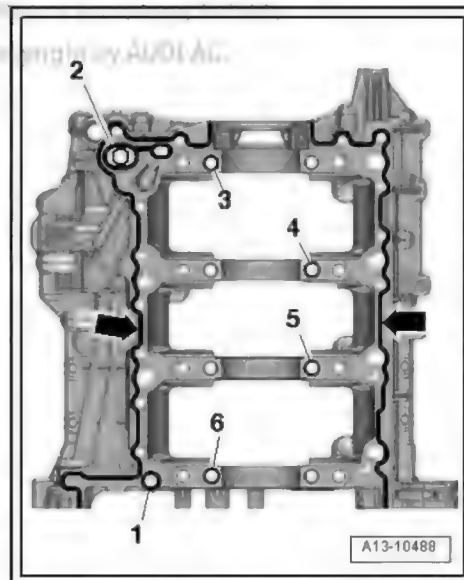
Valve for oil pressure control - N428-

- 1 - Electrical connector
- 2 - O-ring - renew after removal
- 3 - Bolt, 9 Nm
- 4 - Valve for oil pressure control - N428-



Applying sealant to retaining frame, position of dowel sleeves

- Clean surfaces; they must be free of oil and grease.
- Apply sealant beads -arrows- onto clean sealing surfaces of retaining frame as shown in illustration.
- The groove on the sealing surface must be completely filled with sealant.
- The beads of sealant must project 1.5 ... 2.0 mm above the sealing surface.
- Fit seals -1- and -2-.
- Check that dowel sleeves -3 ... 6- are inserted in retaining frame at positions shown in illustration.



## Installing retaining frame

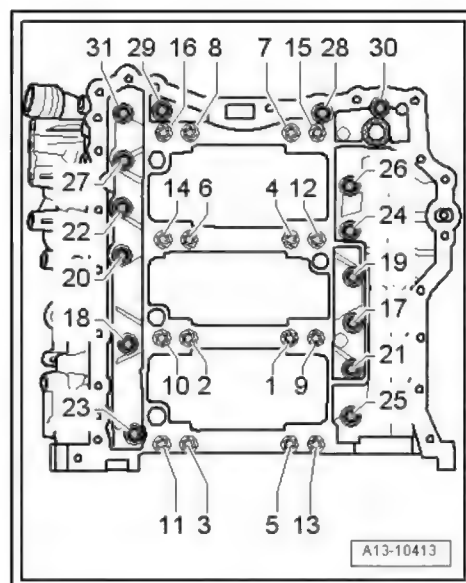


### Note

Renew bolts tightened with specified tightening angle.

- Install long bolts in inner row on retaining frame.
- Tighten bolts in stages in the sequence shown:

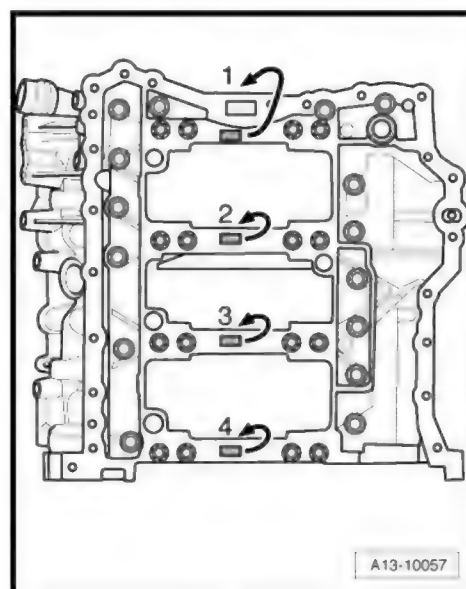
Stage	Bolts	Tightening torque/angle specification
1.	-1 ... 16-	50 Nm
2.	-1 ... 16-	Turn 90° further
3.	-17 ... 31-	15 Nm
4.	-17 ... 31-	Turn 90° further



## Matching crankshaft bearing shells to bearings in cylinder block

- ◆ Bearing shells of the correct thickness are matched to the bearings in the cylinder block at the factory. Coloured dots on the side of the bearing shells are used to identify the bearing shell thickness.
- ◆ The allocation of the bearing shells to the bearing positions in the cylinder block is indicated by a code letter at the relevant bearing on the retaining frame.

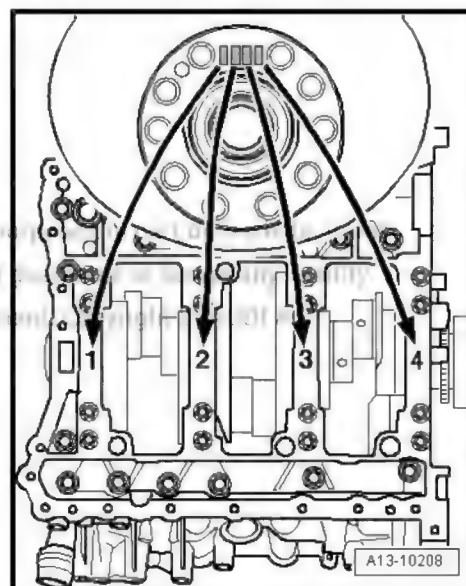
Code letter on retaining frame	Colour coding of bearing
R =	Red
G =	Yellow
B =	Blue
S =	Black



## Matching crankshaft bearing shells to bearings in retaining frame

- ◆ Bearing shells of the correct thickness are matched to the bearings in the retaining frame at the factory. Coloured dots on the side of the bearing shells are used to identify the bearing shell thickness.
- ◆ The allocation of the bearing shells to the bearing positions in the retaining frame is indicated by a sequence of letters on the gearbox flange on the crankshaft. The first letter in the sequence stands for bearing "1", the second letter for bearing "2", etc.

Letter on crankshaft	Colour coding of bearing
R =	Red
G =	Yellow
B =	Blue
S =	Black



## 3.2 Crankshaft dimensions

Honing dimension	Crankshaft bearing journal Ø mm	Crankshaft conrod journal Ø mm
Basic dimension	65.000 – 0.022 – 0.042	56.000 – 0.022 – 0.042

## 3.3 Measuring axial clearance of crankshaft

Special tools and workshop equipment required

- ◆ Universal dial gauge bracket - VW 387-

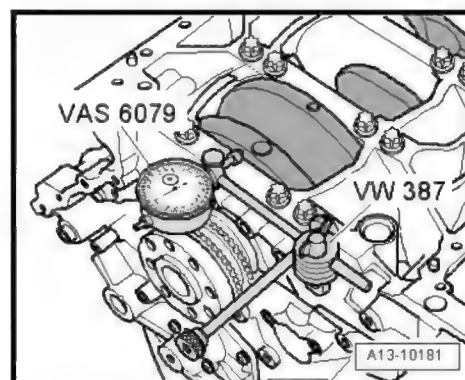


- ◆ Dial gauge - VAS 6079-



### Procedure

- Secure dial gauge - VAS 6079- with universal dial gauge bracket - VW 387- to cylinder block as shown in illustration.
- Apply dial gauge to crank web.
- Press crankshaft against dial gauge by hand and set gauge to "0".
- Push crankshaft away from dial gauge and read off value.
- Axial clearance: 0.15 ... 0.25 mm



## 3.4 Measuring radial clearance of crankshaft

Special tools and workshop equipment required

- ◆ Plastigauge

## Procedure



### Note

Use old bolts when measuring radial clearance.

- Remove retaining frame and clean bearing journals.
- Place a length of Plastigauge corresponding to the width of the bearing on the bearing journal or in the bearing shell.
- The Plastigauge must be positioned in the centre of the bearing shell.
- Fit retaining frame and secure with old bolts  
⇒ [Fig. "Installing retaining frame", page 64](#) without rotating crankshaft.
- Remove retaining frame again.
- Compare width of Plastigauge with measurement scale.

Radial clearance:

- New: 0.015 ... 0.055 mm.
- Wear limit: 0.080 mm.
- When carrying out final assembly, renew bolts.

## 3.5 Removing and installing sender wheel

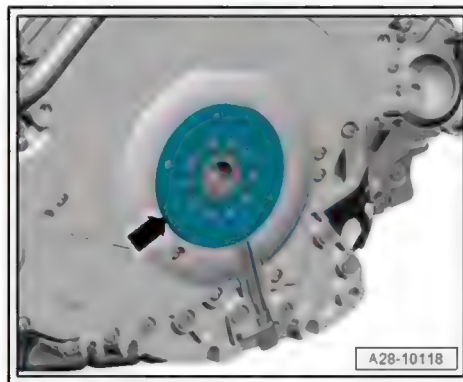
### Removing

- Gearbox removed:
- ◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Removing and installing gearbox
- ◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Removing and installing gearbox
- Remove drive plate  
⇒ ["2.2 Removing and installing drive plate", page 57](#) .
- Detach sender wheel -arrow-.

### Installing

Installation is carried out in reverse order; note the following:

- Install drive plate  
⇒ ["2.2 Removing and installing drive plate", page 57](#) .



### 3.6 Checking sender wheel



#### Caution

*Risk of magnetic fields causing irreparable damage to sender wheel.*

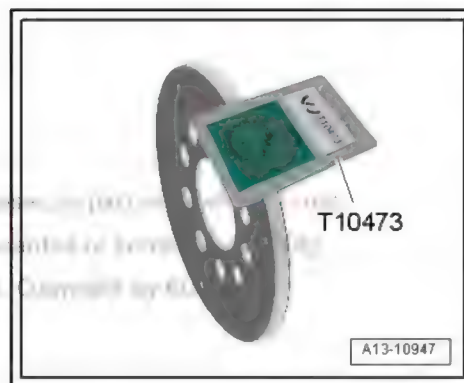
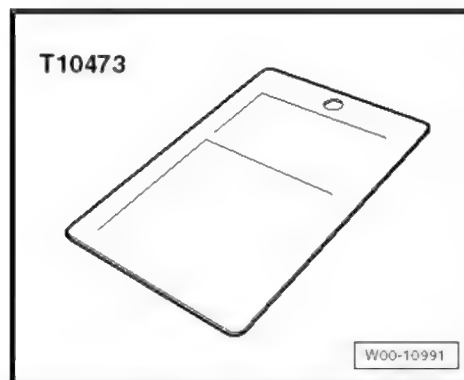
- ◆ *The sender wheel must be kept away from magnets (e.g. base of torch, loudspeaker).*
- ◆ *If the drive plate/flywheel or the sender wheel itself has been removed or renewed, check that the sender wheel is operating correctly before installation ➔ [page 67](#) .*

Special tools and workshop equipment required

- ◆ Sensor gauge - T10473-

#### Procedure

- Sender wheel removed  
➔ ["3.5 Removing and installing sender wheel"](#), [page 66](#) .
- Check entire circumference of sender wheel using sensor gauge - T10473- , as shown in illustration.

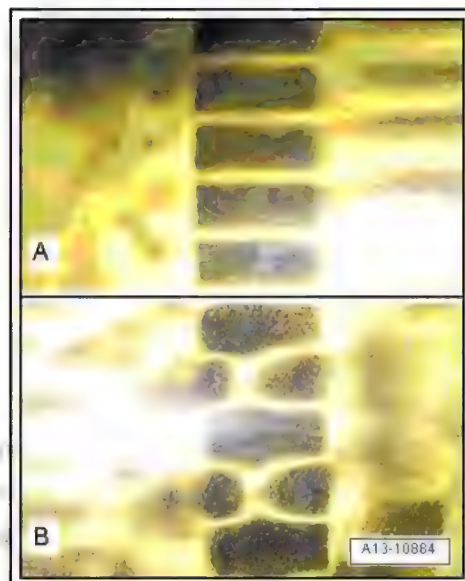




Inspection image of sender wheel

A - Sender wheel OK

B - Sender wheel defective



## 4 Balance shaft

⇒ ["4.1 Exploded view - balance shaft", page 69](#)

⇒ ["4.2 Removing and installing balance shaft", page 69](#)

### 4.1 Exploded view - balance shaft

#### 1 - Balance shaft

- ☐ Removing and installing  
⇒ ["4.2 Removing and installing balance shaft", page 69](#)

#### 2 - Bolt

- ☐ Renew after removing
- ☐ Use locating pin - T40116- as counterhold when loosening and tightening
- ☐ 40 Nm +90°

#### 3 - Chain sprocket for balance shaft

- ☐ With balance weight (gearbox end)

#### 4 - Bearing plate

#### 5 - Bolt

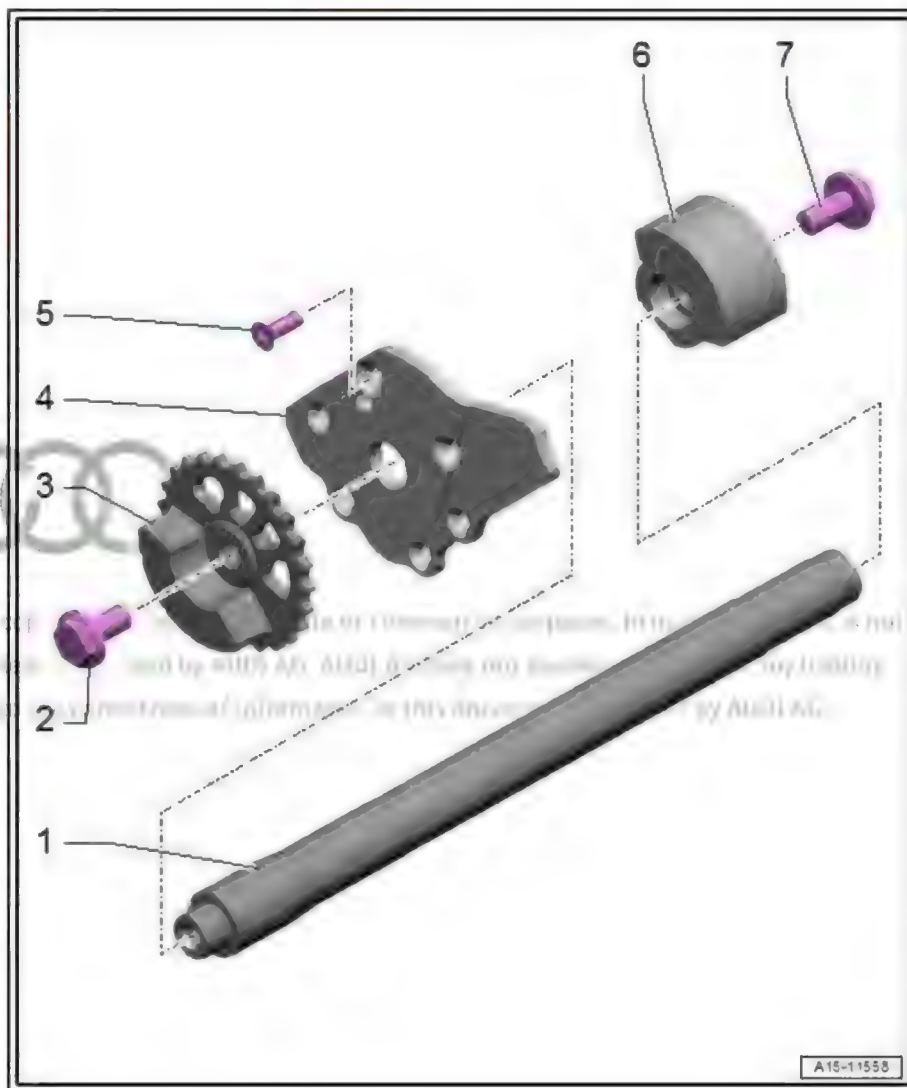
- ☐ 15 Nm

#### 6 - Balance weight (pulley end)

- ☐ Can only be fitted on balance shaft in one position.

#### 7 - Bolt

- ☐ Renew after removing
- ☐ Use locating pin - T40116- as counterhold when loosening and tightening
- ☐ 40 Nm +90°



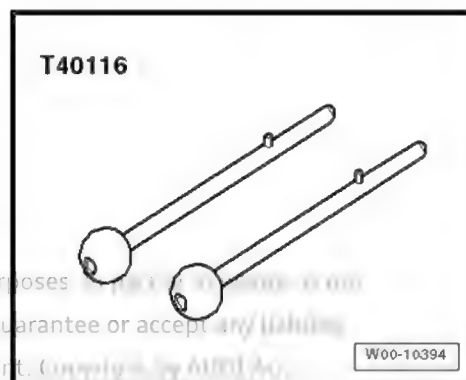
### 4.2 Removing and installing balance shaft

Special tools and workshop equipment required

# ♦ Locating pins - T40116-

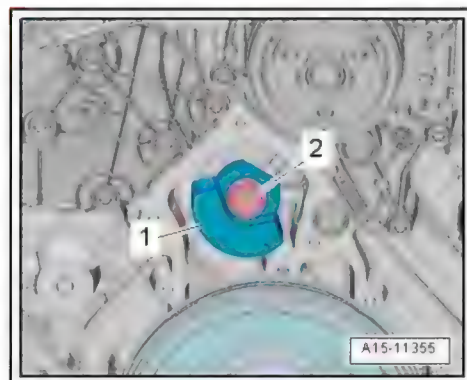
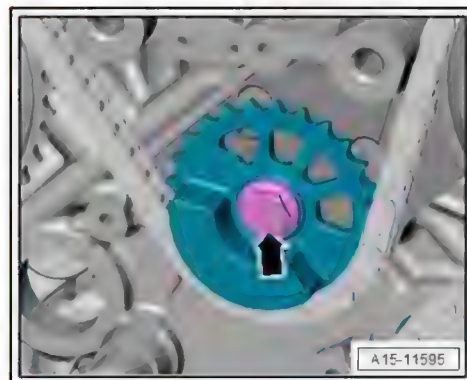


Protected by copyright. Copying for private or commercial purposes is prohibited without the prior written permission of Audi AG. Audi AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by Audi AG.

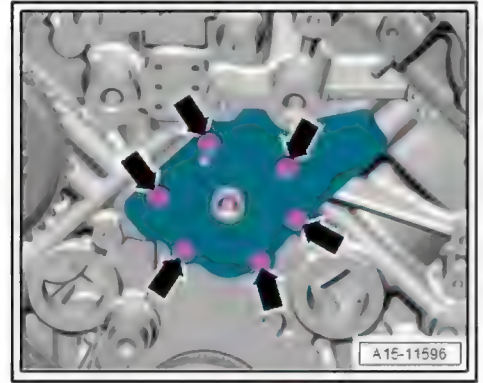


## Removing

- Gearbox removed:
  - ♦ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Removing and installing gearbox
  - ♦ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Removing and installing gearbox
- Remove sealing flange (pulley end)
  - ⇒ ["1.5 Removing and installing sealing flange \(pulley end\)", page 53](#) .
- Remove timing chain cover (bottom)
  - ⇒ ["1.2.3 Removing and installing timing chain cover \(bottom\)", page 86](#) .
- Loosen bolt -arrow- by one turn (counterhold using locating pin -T40116- ).
- Remove drive chain for valve gear
  - ⇒ ["2.6 Removing and installing drive chain for valve gear", page 111](#) .
- Unscrew bolt -2- at pulley end of engine (counterhold balance weight -1- with a suitable pin) and detach balance weight from balance shaft.



- Unscrew bolts -arrows- and detach bearing plate for balance shaft from engine (gearbox end).
- Pull balance shaft to rear out of cylinder block.



### Installing

Installation is carried out in reverse order; note the following:

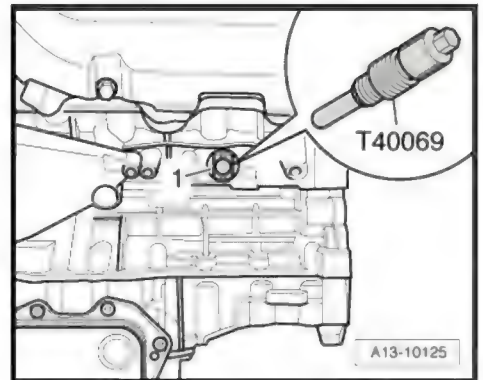
- Crankshaft -1- locked in "TDC" position with locking pin - T40069- .



#### Note

*Balance weights can only be fitted on balance shaft in one position.*

- Install drive chain for valve gear  
⇒ ["2.6 Removing and installing drive chain for valve gear", page 111](#) .
- Install timing chain cover (bottom)  
⇒ ["1.2.3 Removing and installing timing chain cover \(bottom\)", page 86](#) .
- Install sealing flange (pulley end)  
⇒ ["1.5 Removing and installing sealing flange \(pulley end\)", page 53](#) .



### Tightening torques

- ◆ ⇒ ["4.1 Exploded view - balance shaft", page 69](#)



Protected by copyright. Copying for private or commercial purposes in part or in whole is not permitted unless authorized by AUDI AG. AUDI AG does not assume any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

## 5 Pistons and conrods

⇒ ["5.1 Exploded view - pistons and conrods", page 72](#)

⇒ ["5.2 Removing and installing pistons", page 74](#)

⇒ ["5.3 Checking pistons and cylinder bores", page 75](#)

⇒ ["5.4 Checking radial clearance of conrod bearings", page 76](#)

### 5.1 Exploded view - pistons and conrods



#### Note

- ◆ All bearing and running surfaces must be oiled before assembling.
- ◆ Oil spray jet for piston cooling ⇒ [Fig. "Oil spray jet for piston cooling", page 74](#).

#### 1 - Bolts

- ☐ Renew after removing
- ☐ Use old bolts when measuring radial clearance
- ☐ Lubricate threads and contact surface
- ☐ 50 Nm +90°

#### 2 - Conrod bearing cap

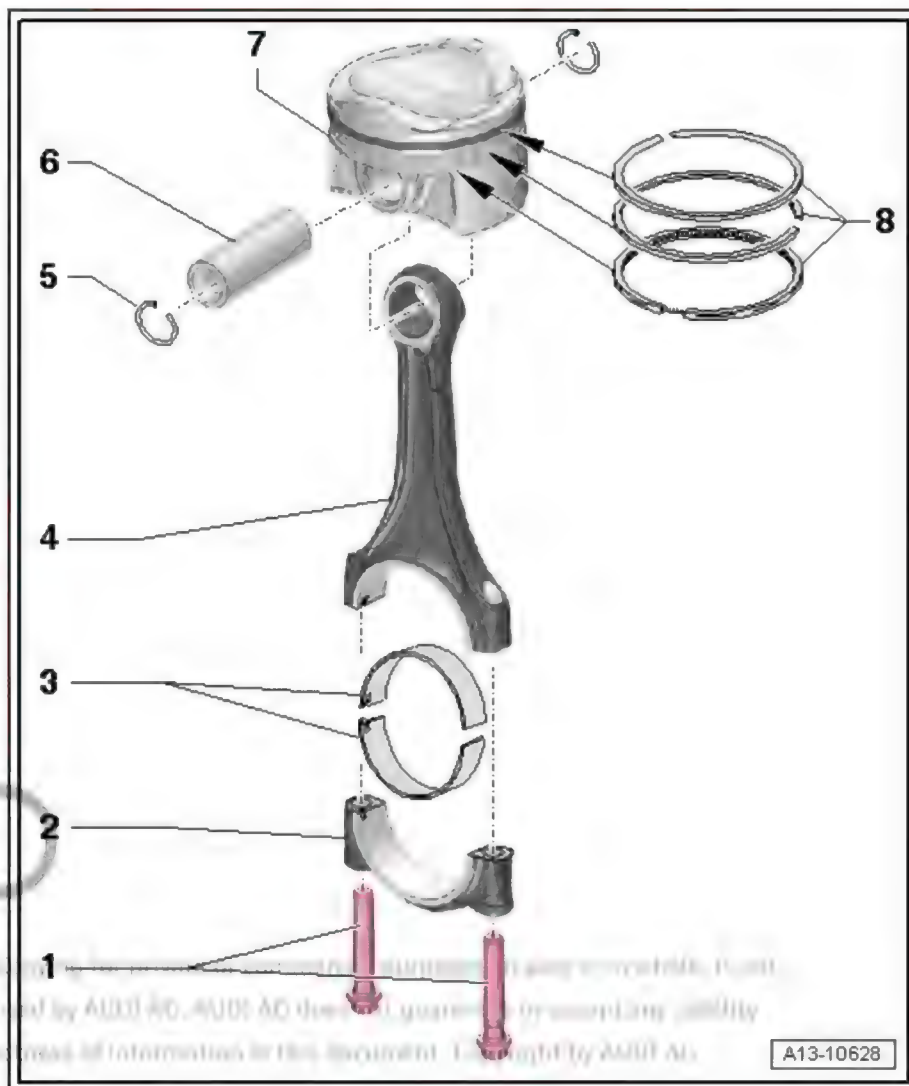
- ☐ Mark installation position for re-installation
- ☐ Mark cylinder and conrod allocation in colour ⇒ [Fig. "Marking conrods", page 73](#)
- ☐ Installation position of conrod pairs ⇒ [Fig. "Conrod installation position", page 73](#)

#### 3 - Bearing shells

- ☐ Ensure that retaining lugs are securely seated.
- ☐ Renew used bearing shells
- ☐ There are oversized bearings available for machined crankshaft conrod journals ⇒ Electronic parts catalogue
- ☐ Lugs on conrod bearings must be on the same side

#### 4 - Conrod

- ☐ Only renew as a complete set
- ☐ Mark cylinder and conrod bearing cap allocation in colour ⇒ [Fig. "Marking conrods", page 73](#)
- ☐ Installation position of conrod pairs ⇒ [Fig. "Conrod installation position", page 73](#)
- ☐ Axial clearance for each conrod pair (when new): 0.20 ... 0.45 mm



- ☐ Measuring radial clearance ⇒ [“5.4 Checking radial clearance of conrod bearings”, page 76](#)

#### 5 - Circlip

- ☐ Renew after removing

#### 6 - Piston pin

- ☐ Removing and installing ⇒ [“5.2 Removing and installing pistons”, page 74](#)

#### 7 - Piston

- ☐ Mark installation position and cylinder number ⇒ [Fig. “Installation position of pistons”](#), page 73
- ☐ Removing and installing ⇒ [“5.2 Removing and installing pistons”, page 74](#)
- ☐ Renew piston if cracking is visible on piston crown or piston skirt
- ☐ Checking pistons and cylinder bores ⇒ [“5.3 Checking pistons and cylinder bores”, page 75](#)

#### 8 - Piston rings

- ☐ Measuring ring gap ⇒ [Fig. “Measuring piston ring gap”](#), page 76
- ☐ Measuring ring-to-groove clearance ⇒ [Fig. “Measuring ring-to-groove clearance”](#), page 76
- ☐ Use piston ring pliers (commercially available) to remove and install
- ☐ Installation position: marking “TOP” or side with lettering faces towards piston crown
- ☐ Offset gaps by 120°

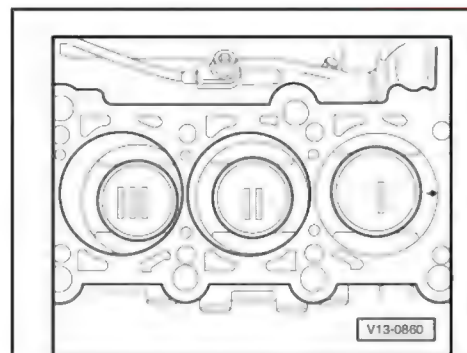
#### Installation position of pistons



#### Caution

*Do not damage the coating of the piston crown.*

- ◆ *If you intend to re-install used pistons, mark the cylinder number on the piston crown using paint. Do not attempt to mark the piston crown with a centre punch or by making a notch or similar.*



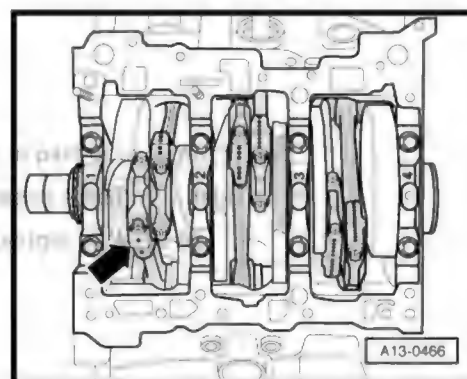
- Arrows on piston crowns point to pulley end.

#### Marking conrods



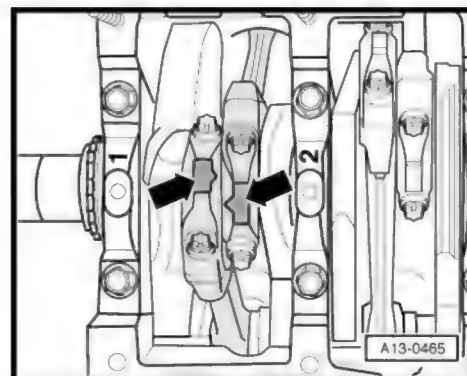
#### Note

- ◆ *Only renew conrods as a complete set.*
- ◆ *Do not interchange conrod bearings.*
- Use a coloured pen to mark matching conrods and conrod bearing caps with cylinder numbers -arrow- for re-installation.



#### Conrod installation position

- The cast lugs -arrows- on the ground surfaces of the conrod pairs “1 and 2”, “3 and 4”, and “5 and 6” must face each other.



## Oil spray jet for piston cooling

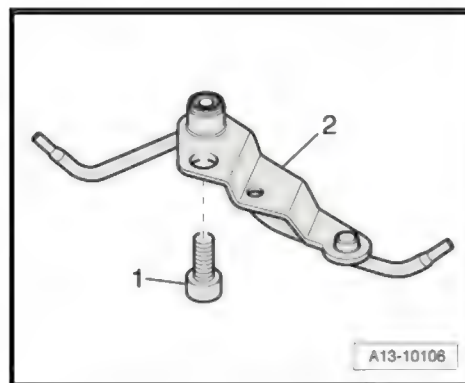
- 1 - Apply locking fluid to bolt and tighten to 9 Nm; for locking fluid refer to ⇒ Electronic parts catalogue .
- 2 - Oil spray jet with spray nozzle valve (opening pressure: 2 ... 2.4 bar)



### Caution

*Risk of damage to oil spray jets.*

- ◆ Do not bend oil spray jets.
- ◆ Always renew bent oil spray jets.



## 5.2 Removing and installing pistons

Special tools and workshop equipment required

- ◆ Pin - VW 222A-



- ◆ Piston ring clamp, commercially available

### Removing

- Engine secured to engine and gearbox support - VAS 6095-  
⇒ ["1.3 Securing engine to engine and gearbox support", page 28](#)
- Remove cylinder head  
⇒ ["3.2 Removing and installing cylinder head", page 117](#) .
- Remove sump (top section)  
⇒ ["1.4 Removing and installing sump \(top section\)", page 160](#) .
- Mark installation position and matching of conrod bearing caps to cylinder and to conrods for re-installation  
⇒ [Fig. "Marking conrods", page 73](#) .
- Unbolt conrod bearing caps.
- Pull out pistons upwards with conrods.



### Note

*If piston pin is difficult to remove, heat piston to approx. 60 °C.*

- Take circlip out of piston pin boss.
- Use drift - VW 222A- to drive out piston pin.

### Installing

Installation is carried out in reverse order; note the following:



## Note

Renew bolts tightened with specified tightening angle.

- Oil running surfaces of bearing shells.
- Install pistons using piston ring clamp.

Installation position:

- Pistons ⇒ Fig. [“Installation position of pistons”](#), page 73
- Conrods ⇒ Fig. [“Conrod installation position”](#), page 73
- Install conrod bearing caps according to markings.
- Install sump (upper section)  
⇒ [“1.4 Removing and installing sump \(top section\)”](#),  
page 160 .
- Install cylinder head  
⇒ [“3.2 Removing and installing cylinder head”](#), page 117 .

Tightening torques

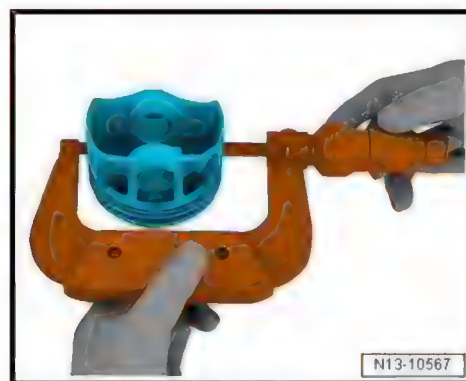
- ◆ ⇒ [“5.1 Exploded view - pistons and conrods”](#), page 72

## 5.3 Checking pistons and cylinder bores

Checking piston

- Using a micrometer (75 ... 100 mm), measure approx. 15 mm from the lower edge, perpendicular to the piston pin axis.
- Maximum deviation from nominal dimension: 0.03 mm.

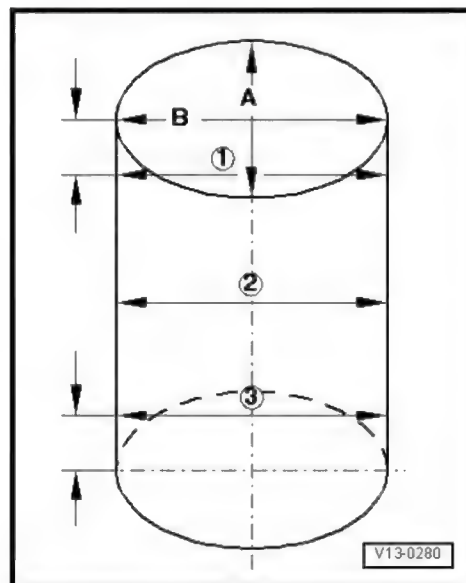
Piston Ø mm	
Nominal dimension	84.49 <sup>1)</sup>
<ul style="list-style-type: none"> <li>• <sup>1)</sup> Dimensions including coating (thickness approx. 0.02 mm). The coating will wear down in service.</li> </ul>	



Measuring cylinder bore

- Use a cylinder gauge - VAS 6078- to take measurements at 3 points in transverse direction -A- and in longitudinal direction -B-.
- Maximum deviation from nominal dimension: 0.08 mm.

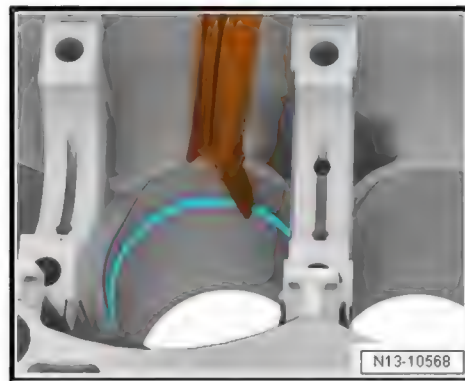
Cylinder bore Ø mm	
Nominal dimension	84.51 <sup>1)</sup>
<ul style="list-style-type: none"> <li>• <sup>1)</sup> Measure at 50 mm into cylinder bore.</li> </ul>	



### Measuring piston ring gap

- Insert ring at right angle to cylinder wall from above and push down into lower cylinder opening approx. 15 mm from bottom of cylinder.
- To do so, use a piston without rings.

Piston ring	new mm	Wear limit mm
1st compression ring	0.20 ... 0.30	0.80
2nd compression ring	0.50 ... 0.70	0.80
Oil scraper ring	0.25 ... 0.50	– 1)
• 1) Specification not yet available.		



### Measuring ring-to-groove clearance

- Clean groove in piston before checking clearance.

Piston ring	new mm	Wear limit mm
1st compression ring	0.04 ... 0.08	0.20
2nd compression ring	0.03 ... 0.07	0.20
Oil scraper ring	0.02 ... 0.06	0.15



## 5.4 Checking radial clearance of conrod bearings

Special tools and workshop equipment required

- ◆ Plastigauge

Procedure



Note

Use old bolts when measuring radial clearance.

- Remove conrod bearing cap.
- Clean bearing cap and bearing journal.
- Place a length of Plastigauge corresponding to the width of the bearing on the bearing journal or in the bearing shell.
- Fit conrod bearing cap and secure with old bolts  
⇒ [Item 1 \(page 72\)](#) without rotating crankshaft.
- Remove conrod bearing cap again.
- Compare width of Plastigauge with measurement scale.

Radial clearance:

- New: 0.010 ... 0.052 mm.
- Wear limit: 0.120 mm.
- When carrying out final assembly, renew bolts.

## 15 – Cylinder head, valve gear

### 1 Timing chain cover

⇒ "1.1 Exploded view - timing chain cover", page 77

⇒ "1.2 Removing and installing timing chain cover", page 80

#### 1.1 Exploded view - timing chain cover

##### 1 - Bolt

- ☐ Renew after removing
- ☐ Tightening torque and sequence  
⇒ Fig. "Timing chain cover (bottom) - tightening torque and tightening sequence", page 80

##### 2 - Timing chain cover (bottom)

- ☐ Removing and installing  
⇒ "1.2.3 Removing and installing timing chain cover (bottom)", page 86

##### 3 - Oil seal

- ☐ For crankshaft (gearbox end)
- ☐ Renewing  
⇒ "2.3 Renewing crankshaft oil seal (gearbox end)", page 58

##### 4 - Dowel sleeve

- ☐ 2x

##### 5 - Bolt

- ☐ Tightening torque  
⇒ Item 3 (page 165)

##### 6 - Engine oil cooler

- ☐ Removing and installing  
⇒ "2.2 Removing and installing engine oil cooler", page 165

##### 7 - Gasket

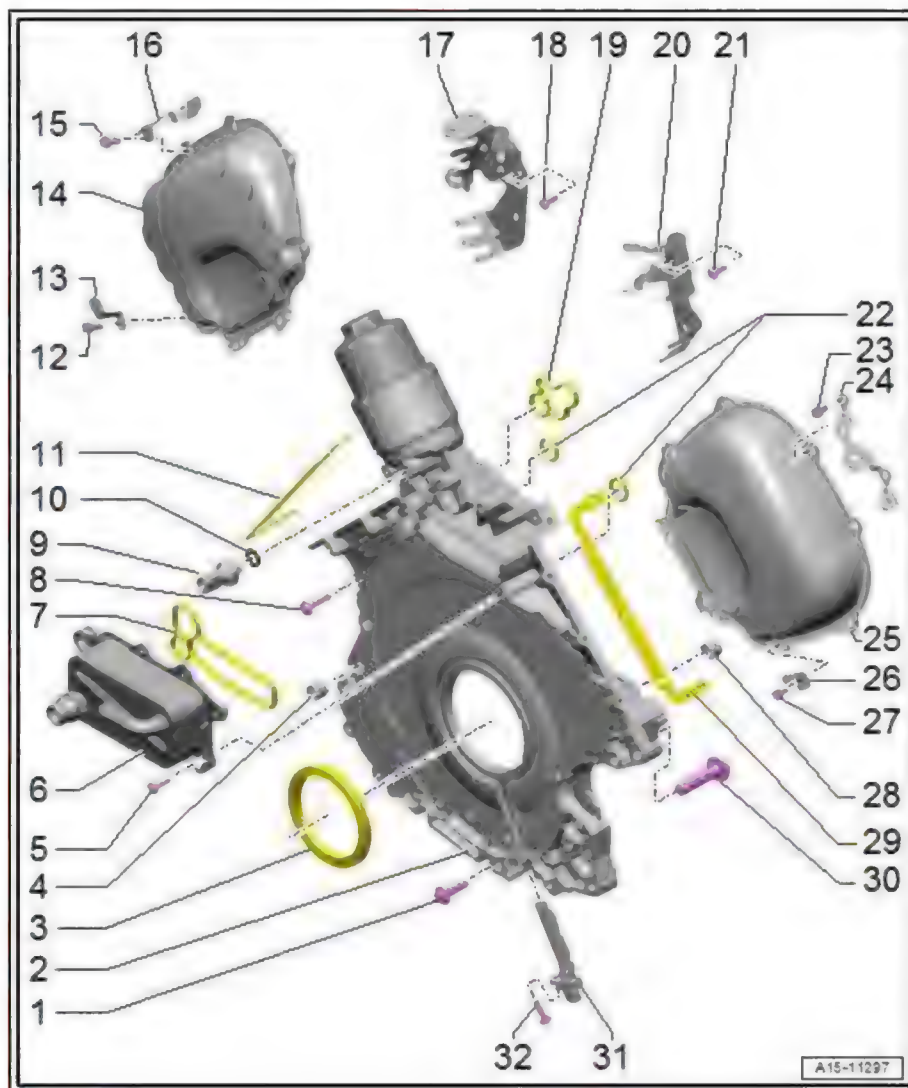
- ☐ Renew after removing

##### 8 - Bolt

- ☐ Renew after removing
- ☐ Tightening torque and sequence  
⇒ Fig. "Timing chain cover (bottom) - tightening torque and tightening sequence", page 80

##### 9 - Oil pressure switch - F22-

- ☐ Opening/closing pressure 2.5 ... 3.2 bar
- ☐ Grey insulation
- ☐ Check in **Guided Fault Finding** ⇒ Vehicle diagnostic tester
- ☐ Removing and installing ⇒ "4.3 Removing and installing oil pressure switch F22", page 173
- ☐ 20 Nm





- 10 - Seal
  - ☐ Renew after removing
- 11 - Cylinder head gasket (left-side)
- 12 - Bolt
  - ☐ Renew after removing
  - ☐ Tightening torque and sequence
    - ⇒ [Fig. "Timing chain cover \(left-side\) - tightening torque and sequence"](#) , page 79
- 13 - Bracket
- 14 - Timing chain cover (left-side)
  - ☐ Removing and installing ⇒ ["1.2.1 Removing and installing timing chain cover \(left-side\)"](#) , page 80
- 15 - Bolt
  - ☐ Renew after removing
  - ☐ Tightening torque and sequence
    - ⇒ [Fig. "Timing chain cover \(left-side\) - tightening torque and sequence"](#) , page 79
- 16 - Bracket
- 17 - Bracket
  - ☐ For electrical connectors for Lambda probes (left-side)
- 18 - Bolt
  - ☐ Tightening torque and sequence
    - ⇒ [Fig. "Timing chain cover \(left-side\) - tightening torque and sequence"](#) , page 79
- 19 - Seal
  - ☐ Renew after removing
- 20 - Bracket
  - ☐ For electrical connectors for Lambda probes (right-side)
- 21 - Bolt
  - ☐ Tightening torque and sequence
    - ⇒ [Fig. "Timing chain cover \(left-side\) - tightening torque and sequence"](#) , page 79
- 22 - Seals
  - ☐ Renew after removing
- 23 - Bolt
  - ☐ Tightening torque and sequence
    - ⇒ [Fig. "Timing chain cover \(right-side\) - tightening torque and sequence"](#) , page 79
- 24 - Bracket
  - ☐ For electrical connectors
- 25 - Timing chain cover (right-side)
  - ☐ Removing and installing ⇒ ["1.2.1 Removing and installing timing chain cover \(left-side\)"](#) , page 80
- 26 - Bracket
- 27 - Bolt
  - ☐ Renew after removing
  - ☐ Tightening torque and sequence
    - ⇒ [Fig. "Timing chain cover \(right-side\) - tightening torque and sequence"](#) , page 79
- 28 - Dowel sleeve
  - ☐ 2x
- 29 - Cylinder head gasket (right-side)
- 30 - Bolt
  - ☐ Tightening torque and sequence
    - ⇒ [Fig. "Timing chain cover \(bottom\) - tightening torque and tightening sequence"](#) , page 80

### 31 - Engine speed sender - G28-

- ☐ Removing and installing ⇒ ["1.6 Removing and installing engine speed sender G28", page 380](#)

### 32 - Bolt

- ☐ Tightening torque ⇒ [Item 11 \(page 376\)](#)

### Timing chain cover (left-side) - tightening torque and sequence

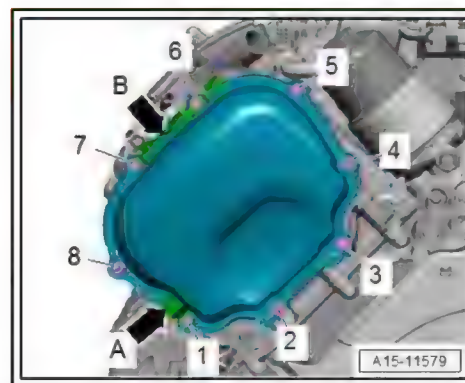


#### Note

- ◆ *Renew bolts tightened with specified tightening angle.*
- ◆ *The brackets -arrows A and B- are secured together with the timing chain cover (left-side).*
- ◆ *-Item 8- is a centre hex stud.*

- Tighten bolts in stages in the sequence shown:

Stage	Bolts	Tightening torque/angle specification
1.	-1 ... 8-	5 Nm
2.	-1 ... 8-	Turn 90° further



### Timing chain cover (right-side) - tightening torque and sequence

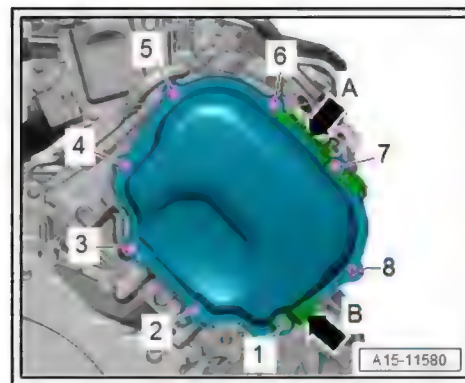


#### Note

- ◆ *Renew bolts tightened with specified tightening angle.*
- ◆ *The brackets -arrows A and B- are secured together with the timing chain cover (right-side).*
- ◆ *-Item 8- is a centre hex stud.*

- Tighten bolts in stages in the sequence shown:

Stage	Bolts	Tightening torque/angle specification
1.	-1 ... 8-	5 Nm
2.	-1 ... 8-	Turn 90° further



Timing chain cover (bottom) - tightening torque and tightening sequence

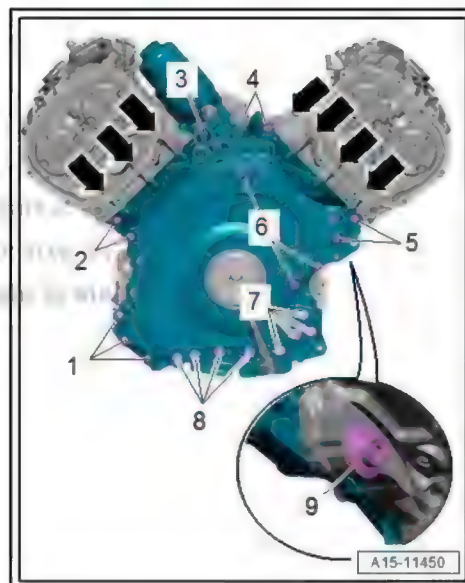


Note

Renew bolts tightened with specified tightening angle.

Tighten bolts in stages as follows:

Stage	Bolts	Tightening torque/angle specification
1.	-arrows-	3 Nm
2.	-1 ... 9-	3 Nm in diagonal sequence
3.	-1 ... 5-	Turn 90° further
4.	-arrows-	9 Nm
5.	-6, 7, 8-	8 Nm
6.	-6, 7, 8-	Turn 90° further
7.	-9-	20 Nm
8.	-9-	Turn 180° further



## 1.2 Removing and installing timing chain cover

⇒ "1.2.1 Removing and installing timing chain cover (left-side)", page 80

⇒ "1.2.2 Removing and installing timing chain cover (right-side)", page 83

⇒ "1.2.3 Removing and installing timing chain cover (bottom)", page 86

### 1.2.1 Removing and installing timing chain cover (left-side)

Special tools and workshop equipment required

- ◆ Electric drill with plastic brush
- ◆ Safety goggles
- ◆ Sealant ⇒ Electronic parts catalogue

Removing



Note

Re-install all cable ties in the same locations when installing.

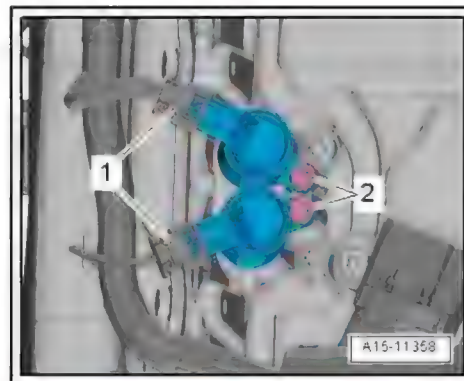
- Remove engine cover panel  
⇒ "3.1 Removing and installing engine cover panel", page 43 .
- Unbolt combination valve (left-side) for secondary air system from cylinder head ⇒ page 359 and place to one side.
- Remove coolant pipe (left-side)  
⇒ "3.2.4 Removing and installing coolant pipe (left-side)", page 213 .

- Unplug connectors -1- for camshaft control valve 2 - N208- and for exhaust camshaft control valve 2 - N319- .

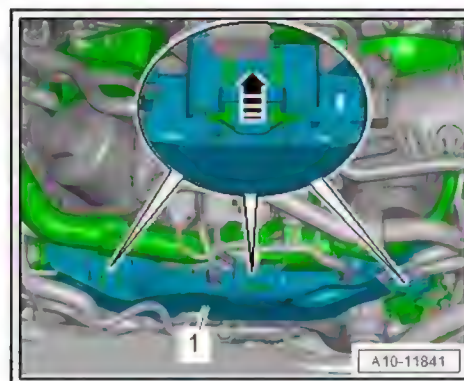


Note

*Disregard -item 2-.*



- Release retainers -arrow-, detach wiring duct -1- towards rear and press to one side.

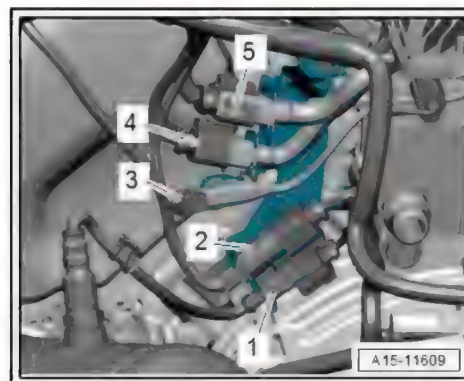


- Detach electrical connectors -3, 4, 5- from bracket and place to one side.

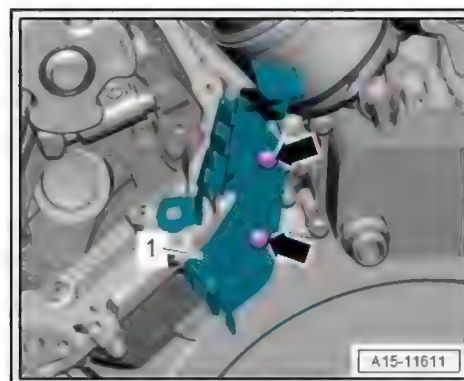


Note

*Disregard items -1 and 2-.*



- Unscrew bolts -arrows- and detach bracket -1- for electrical connectors.



Translated by  (VAG) for private-commercial use. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage or retrieval system, without prior permission in writing from Audi AG. All other rights reserved. Copyright by Audi AG.

- Unscrew bolts -1 ... 8- and detach brackets -arrows A, B-.
- Carefully release timing chain cover (left-side) from bonded joint, e.g. using a spatula, and detach.

#### Installing



#### Note

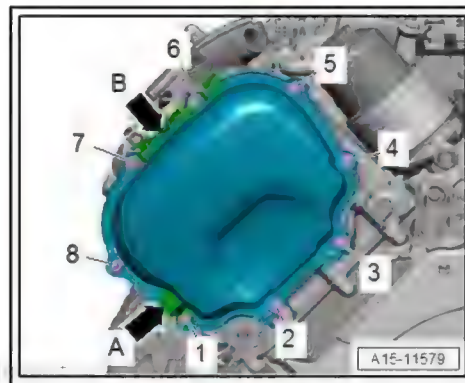
- ◆ Renew bolts tightened with specified tightening angle.
- ◆ Renew O-rings after removing.
- Remove old sealant from sealing surfaces.



#### Caution

Protect lubrication system against contamination.

- ◆ Cover exposed parts of the engine.

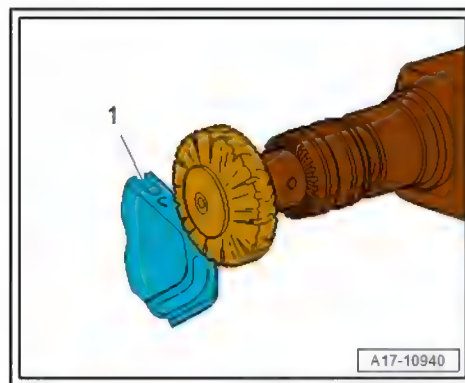


#### WARNING

Risk of eye injury.

- ◆ Put on safety goggles.

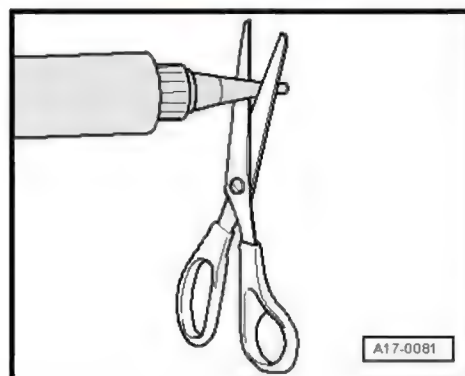
- Remove remaining sealant on timing chain cover -1- and cylinder head using rotating plastic brush or similar.
- Clean surfaces; they must be free of oil and grease.



#### Note

Note the use-by date of the sealant.

- Cut off nozzle of tube at front marking (nozzle Ø approx. 2 mm).





#### Caution

*Make sure lubrication system is not clogged by excess sealant.*

- ◆ *The sealant bead must not be thicker than specified.*

- Apply sealant bead -arrow- onto clean sealing surfaces of timing chain cover as illustrated.
- Width of sealant bead: 2.5 mm.



#### Note

*The timing chain cover must be installed within 5 minutes after applying the sealant.*

- Fit timing chain cover (left-side) together with brackets -arrows A and B- and tighten bolts  
⇒ Fig. [“Timing chain cover \(left-side\) - tightening torque and sequence”](#), page 79 .

Remaining installation steps are carried out in reverse sequence; note the following:



#### Note

*Renew O-ring after removal.*

- Install coolant pipe (left-side)  
⇒ [“3.2.4 Removing and installing coolant pipe \(left-side\)”](#), page 213 .
- Install combination valve for secondary air  
⇒ [“3.4.1 Removing and installing combination valve \(left-side\)”](#), page 359 .
- Install engine cover panel  
⇒ [“3.1 Removing and installing engine cover panel”](#), page 43 .

Tightening torques

- ◆ ⇒ Fig. [“Timing chain cover \(left-side\) - tightening torque and sequence”](#), page 79

## 1.2.2 Removing and installing timing chain cover (right-side)

Special tools and workshop equipment required

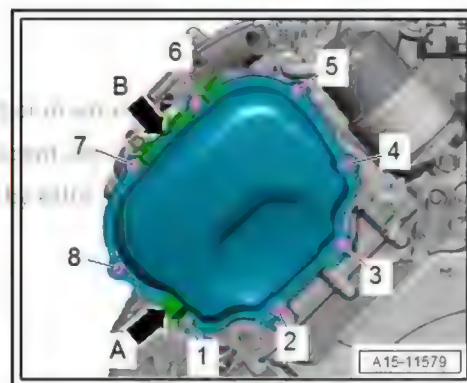
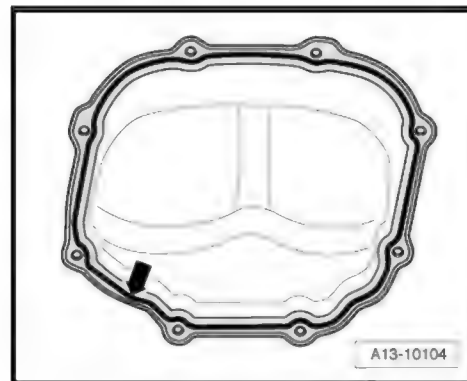
- ◆ Electric drill with plastic brush
- ◆ Safety goggles
- ◆ Sealant ⇒ Electronic parts catalogue

Removing

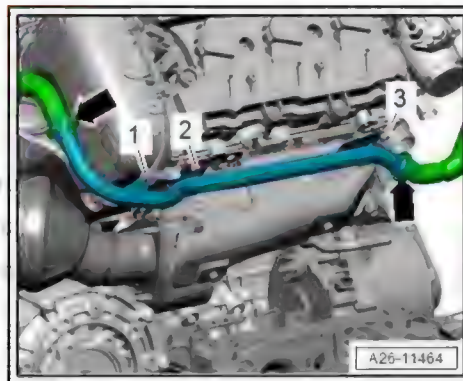


#### Note

*Re-install all cable ties in the same locations when installing.*



- Remove engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel"](#),  
[page 43](#) .
- Remove air cleaner housing  
⇒ ["3.2 Removing and installing air cleaner housing"](#),  
[page 292](#) .
- Remove Lambda probe - G39-  
⇒ ["8.2.1 Removing and installing Lambda probe G39 / G130"](#),  
[page 330](#) .
- Press release tabs on both sides and disconnect secondary air hoses -arrows-.
- Remove nuts -1, 3- and bolt -2-, move secondary air pipe to side.
- Unbolt combination valve (right-side) for secondary air system from cylinder head ⇒ [page 362](#) and place to one side.

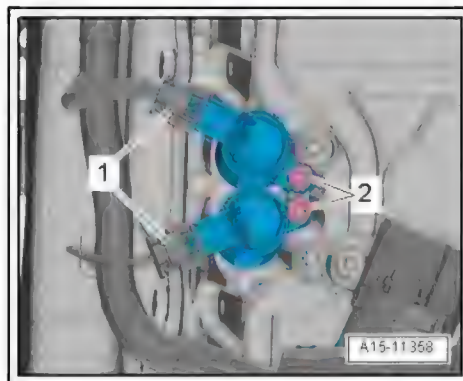


- Unplug connectors -1- for camshaft control valve - N205- and exhaust camshaft control valve 2 - N318- .

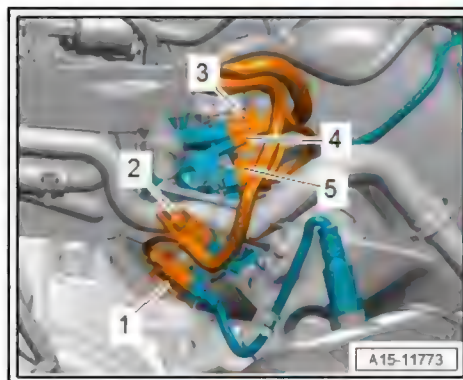


Note

Disregard -item 2-.



- Detach electrical connectors -1 ... 5- from bracket and place to one side.



- Move wiring harness clear at timing chain cover (right-side).
- Unscrew bolts -1- ... 8- and detach brackets -arrows A, B-.
- Carefully release timing chain cover (right-side) from bonded joint, e.g. using a spatula, and detach.

#### Installing



#### Note

- ◆ Renew bolts tightened with specified tightening angle.
- ◆ Renew O-rings after removing.

- Remove old sealant from sealing surfaces.



#### Caution

*Protect lubrication system against contamination.*

- ◆ Cover exposed parts of the engine.



#### WARNING

*Risk of eye injury.*

- ◆ Put on safety goggles.

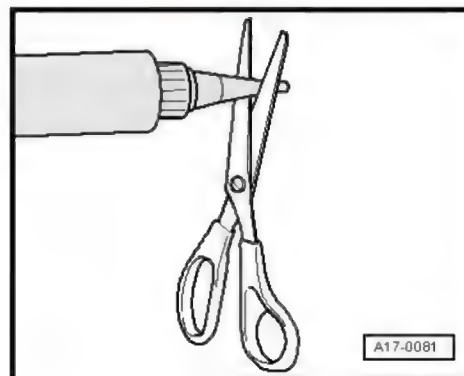
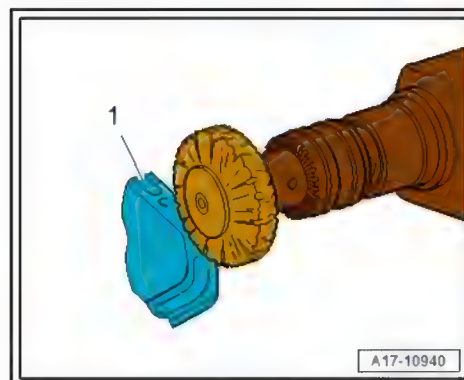
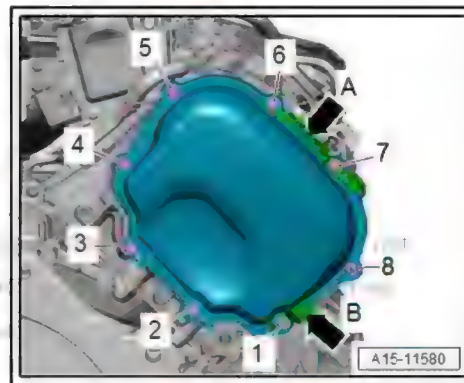
- Remove remaining sealant on timing chain cover -1- and cylinder head using rotating plastic brush or similar.
- Clean surfaces; they must be free of oil and grease.



#### Note

*Note the use-by date of the sealant.*

- Cut off nozzle of tube at front marking (nozzle Ø approx. 2 mm).





### Caution

*Make sure lubrication system is not clogged by excess sealant.*

- ◆ *The sealant bead must not be thicker than specified.*

- Apply sealant bead -arrow- onto clean sealing surfaces of timing chain cover as illustrated.
- Width of sealant bead: 2.5 mm.



### Note

*The timing chain cover must be installed within 5 minutes after applying the sealant.*

- Fit timing chain cover (right-side) together with brackets -arrows A and B- and tighten bolts  
⇒ [Fig. "Timing chain cover \(right-side\) - tightening torque and sequence", page 79](#).

Remaining installation steps are carried out in reverse sequence; note the following:



### Note

*Renew O-ring after removal.*

- Install combination valve for secondary air  
⇒ ["3.4.2 Removing and installing combination valve \(right-side\)", page 362](#).
- Install Lambda probe - G39-  
⇒ ["8.2.1 Removing and installing Lambda probe G39 / G130", page 330](#).
- Install air cleaner housing  
⇒ ["3.2 Removing and installing air cleaner housing", page 292](#).
- Install engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#).

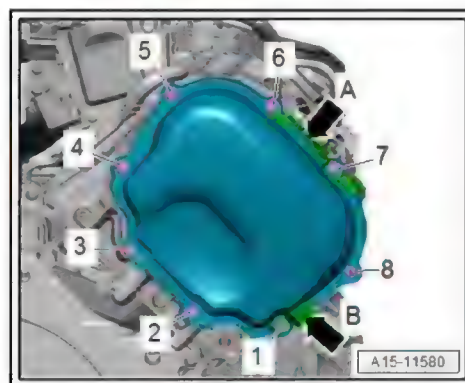
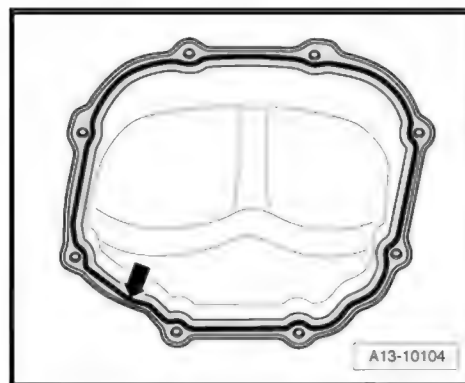
### Tightening torques

- ◆ ⇒ [Fig. "Timing chain cover \(right-side\) - tightening torque and sequence", page 79](#)
- ◆ ⇒ ["4.1 Exploded view - valve gear", page 129](#)
- ◆ ⇒ ["3.1 Exploded view - secondary air system", page 354](#)

## 1.2.3 Removing and installing timing chain cover (bottom)

### Special tools and workshop equipment required

- ◆ Electric drill with plastic brush attachment
- ◆ Safety goggles
- ◆ Sealant ⇒ Electronic parts catalogue



## Removing

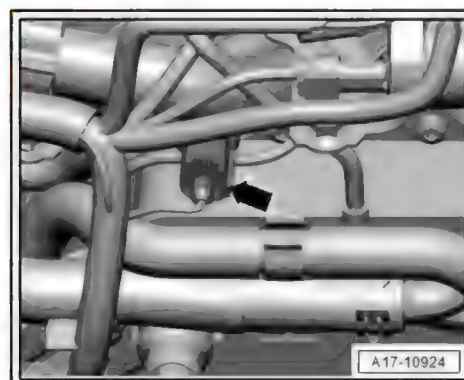
- Gearbox removed:
- ◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Removing and installing gearbox
- ◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Removing and installing gearbox
- Engine oil drained ⇒ Maintenance ; Booklet 411



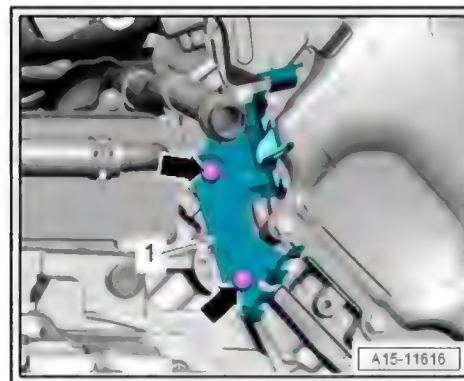
### Note

*Re-install all cable ties in the same locations when installing.*

- Remove drive plate  
⇒ ["2.2 Removing and installing drive plate", page 57](#) .
- Remove timing chain covers (left and right)  
⇒ ["1.2.1 Removing and installing timing chain cover \(left-side\)", page 80](#) ,  
⇒ ["1.2.2 Removing and installing timing chain cover \(right-side\)", page 83](#) .
- Remove oil filter element ⇒ Maintenance ; Booklet 411 .
- Remove engine oil cooler  
⇒ ["2.2 Removing and installing engine oil cooler", page 165](#) .
- Unplug electrical connector -arrow- at oil pressure switch - F22- and move wiring clear.



- Unscrew bolts -arrows- and detach bracket -1-.



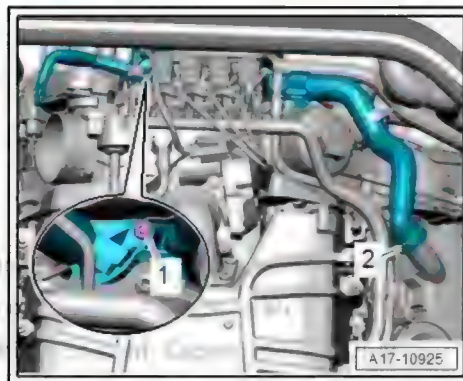
Protected by copyright. Copying for private or commercial purposes without the  
written consent of Audi AG, Audi AG, is prohibited. Audi AG is not responsible for any  
damages or consequences of use of this document. Audi AG

- Remove bolt -1-.
- Detach connection with crankcase breather hose, move clear and swivel to side.



Note

Disregard -item 2-.

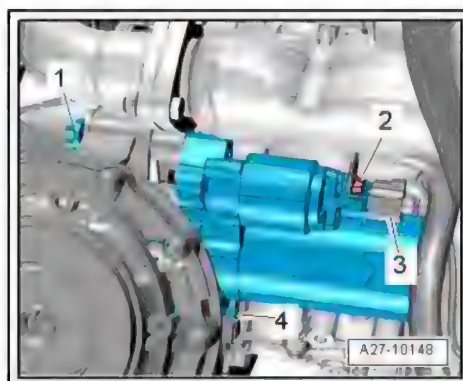


- Unplug electrical connector -3- at starter (push retainer to the rear and press down release catch).
- Remove nut -2- for electrical wiring and detach starter.

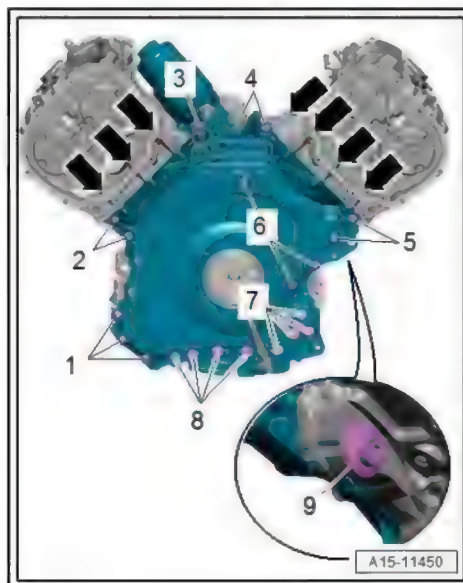


Note

Disregard items -1 and 4-.



- Remove bolts -arrows-.
- Slacken bolts -1 ... 9- in diagonal sequence and remove.
- Carefully release timing chain cover (bottom) from bonded joint and remove cover.
- Press crankshaft oil seal (gearbox end) out of timing chain cover (bottom).



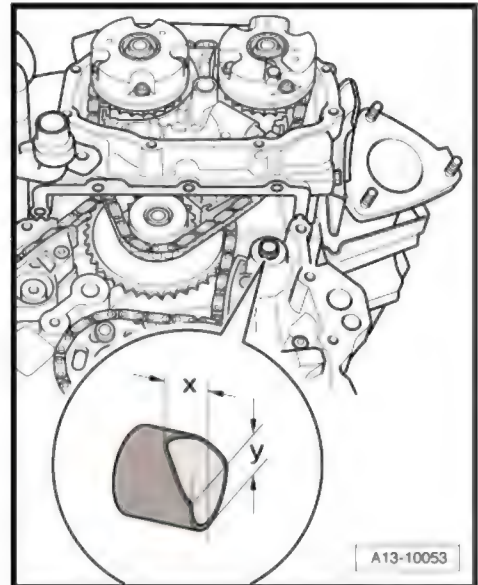
## Installing

Installation is carried out in reverse order; note the following:



### Note

- ◆ *Renew bolts tightened with specified tightening angle.*
- ◆ *Renew seals after removing.*
- Pull dowel sleeve at top right out of cylinder block.
- Bevel the dowel sleeve with a file, as illustrated.
- Dimension -x- = 6.5 mm
- Dimension -y- = 8 mm
- Fit dowel sleeve on cylinder block in such a way that the bevelled side points upwards.



### Note

*Bevelling the dowel sleeve makes it easier to fit the timing chain cover (bottom) with the cylinder head installed.*



### Caution

*Protect lubrication system against contamination.*

- ◆ *Cover exposed parts of the engine.*

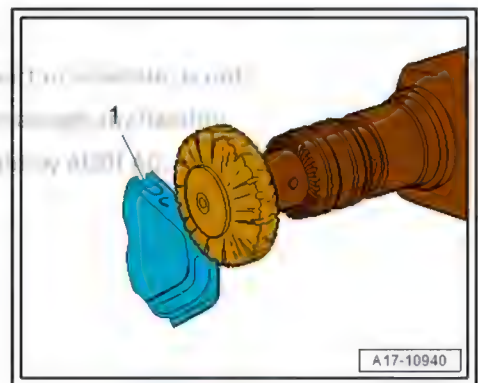


### WARNING

*Risk of eye injury.*

- ◆ *Put on safety goggles.*

- Remove remaining sealant on timing chain cover (bottom) -1-, cylinder block and cylinder head using rotating plastic brush or similar.
- Clean surfaces; they must be free of oil and grease.
- Before installing gearbox, remove residue from threaded holes for engine/gearbox bolts in cylinder block using a thread tap.

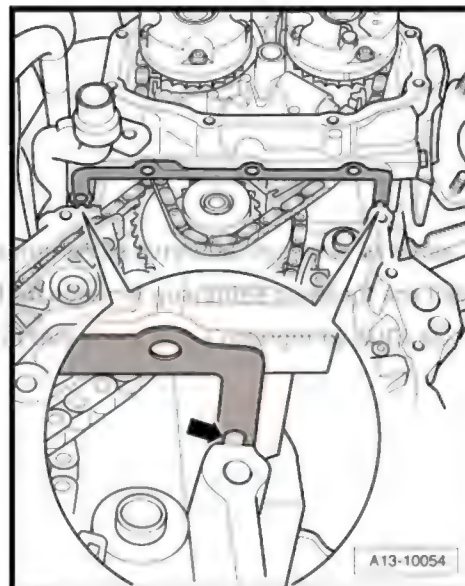


- Clean old sealant from holes -arrow- in cylinder head gaskets.



#### Note

With the cylinder head installed the holes in the cylinder head gasket are only half visible.



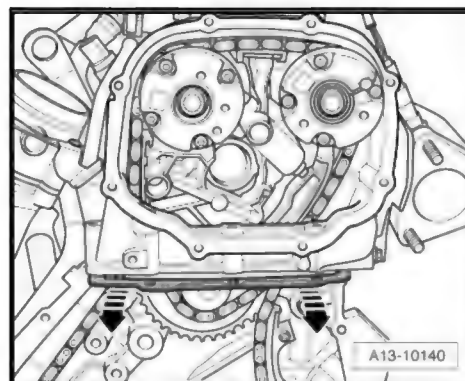
A13-10054



#### Caution

Avoid damage to cylinder head gasket.

- ♦ Only bend the ends of the cylinder head gaskets slightly and do not kink.



A13-10140



#### Note

If the cylinder head gasket has been bent and kinked it must be renewed.

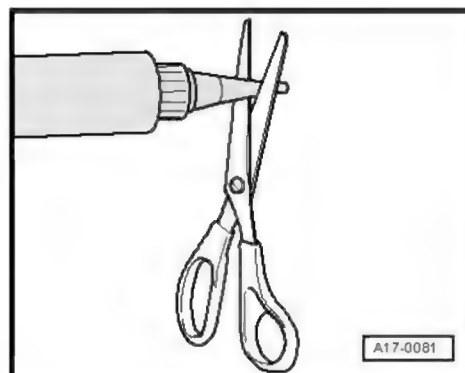
- Carefully bend the ends of the cylinder head gaskets down very slightly -arrows-, just far enough to be able to clean the upper sealing surface on the cylinder head gasket and cylinder head.
- Clean cylinder head gaskets (top and bottom); they must be free of oil and grease.



#### Note

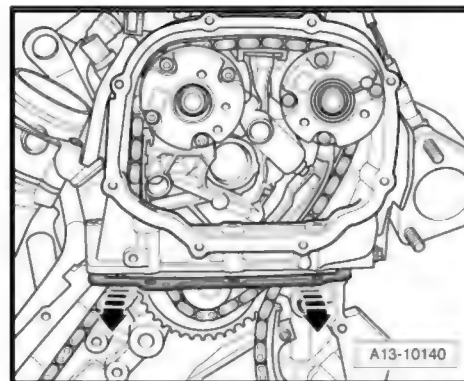
Note the use-by date of the sealant.

- Cut off nozzle of tube at front marking (nozzle Ø approx. 2 mm).

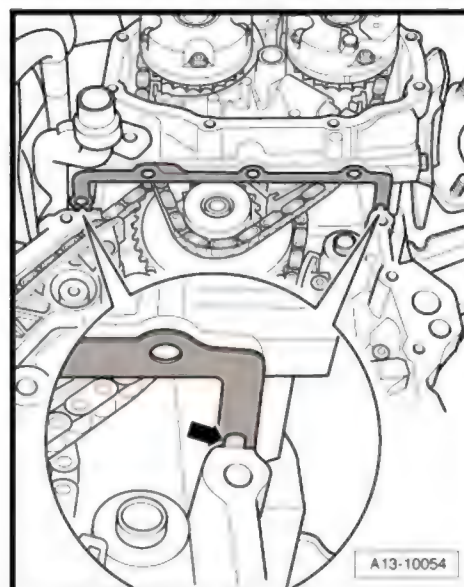


A17-0081

- Apply a small amount of sealant to sealing surfaces of cylinder head gaskets (top and bottom). To do so, you again have to bend cylinder head gaskets down very slightly -arrows-.
- Use a flat object (e.g. a feeler gauge) to apply sealant to the area between cylinder head and gasket.



- Clean holes -arrow- in cylinder head gaskets and fill them with sealant.



#### Caution

*Make sure lubrication system is not clogged by excess sealant.*

- ◆ *The sealant bead must not be thicker than specified.*

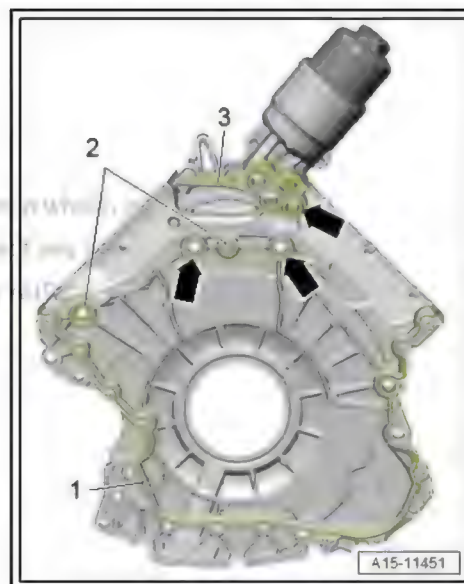
- Apply sealant beads -1 ... 3- onto the clean sealing surfaces of the timing chain cover (bottom) as illustrated.
- The groove on the sealing surface must be completely filled with sealant.
- The beads of sealant must project 1.5 ... 2.0 mm above the sealing surface.
- Apply sealant -3- in a continuous bead as shown in illustration (although groove is not continuous).



#### Note

*The timing chain cover must be installed within 5 minutes after applying the sealant.*

- Insert seals -arrows- in grooves on timing chain cover (bottom).



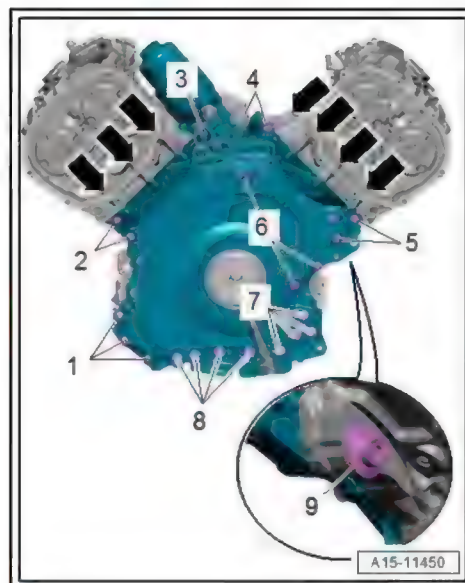
- Fit timing chain cover (bottom), guiding it towards sealing surface on cylinder block and cylinder head at an angle and from below.
- Take care not to damage the cylinder head gaskets when fitting the cover.
- Tighten bolts  
⇒ [Fig. "Timing chain cover \(bottom\) - tightening torque and tightening sequence"](#), page 80 .

Remaining installation steps are carried out in reverse sequence; note the following:

- Install crankshaft oil seal (gearbox end)  
⇒ ["2.3 Renewing crankshaft oil seal \(gearbox end\)"](#), page 58 .
- Install engine oil cooler  
⇒ ["2.2 Removing and installing engine oil cooler"](#), page 165 .
- Install oil filter element ⇒ Maintenance ; Booklet 411 .
- Install timing chain covers (left and right)  
⇒ ["1.2 Removing and installing timing chain cover"](#), page 80 .
- Install drive plate  
⇒ ["2.2 Removing and installing drive plate"](#), page 57 .
- Fill with engine oil and check oil level ⇒ Maintenance ; Booklet 411 .

#### Tightening torques

- ◆ ⇒ [Fig. "Timing chain cover \(bottom\) - tightening torque and tightening sequence"](#), page 80
- ◆ ⇒ ["3.1 Exploded view - crankcase breather system"](#), page 167



## 2 Chain drive

- ⇒ ["2.1 Exploded view - camshaft timing chains", page 93](#)
- ⇒ ["2.2 Exploded view - drive chain for valve gear", page 96](#)
- ⇒ ["2.3 Exploded view - drive chain for oil pump", page 98](#)
- ⇒ ["2.4 Removing camshaft timing chain from camshafts", page 98](#)
- ⇒ ["2.5 Removing and installing camshaft timing chain", page 108](#)
- ⇒ ["2.6 Removing and installing drive chain for valve gear", page 111](#)
- ⇒ ["2.7 Removing and installing drive chain for oil pump", page 113](#)

### 2.1 Exploded view - camshaft timing chains

Camshaft timing chain (left-side)

#### 1 - Bolts

- ☐ Tightening torque  
⇒ [Item 4 \(page 96\)](#)

#### 2 - Bearing mounting

- ☐ For drive chain sprocket  
for camshaft timing  
chain (left-side)

#### 3 - Bolt

- ☐ Renew after removing
- ☐ 80 Nm +90°

#### 4 - Camshaft adjuster

- ☐ For exhaust camshaft
- ☐ Identification: "EX"
- ☐ Removing and installing  
⇒ ["2.4 Removing cam-  
shaft timing chain from  
camshafts", page 98](#)

#### 5 - Bolt

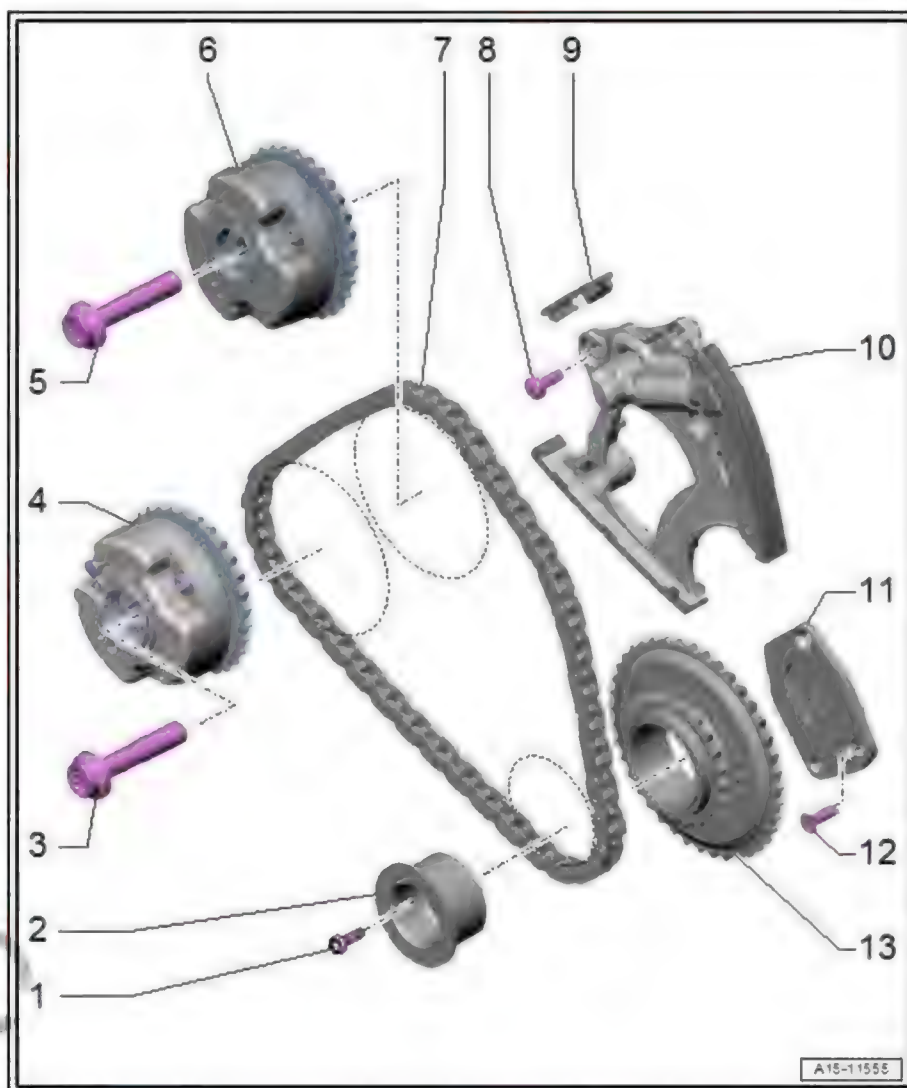
- ☐ Renew after removing
- ☐ 80 Nm +90°

#### 6 - Camshaft adjuster

- ☐ For inlet camshaft
- ☐ Identification: "IN"
- ☐ Removing and installing  
⇒ ["2.4 Removing cam-  
shaft timing chain from  
camshafts", page 98](#)

#### 7 - Camshaft timing chain (left-side)

- ☐ Mark direction of rota-  
tion for re-installation  
with a paint marker
- ☐ Removing from camshafts ⇒ ["2.4 Removing camshaft timing chain from camshafts", page 98](#)
- ☐ Removing and installing ⇒ ["2.5 Removing and installing camshaft timing chain", page 108](#)



# 8 - Bolt

- ☐ 9 Nm

# 9 - Slide

# 10 - Chain tensioner

- ☐ For camshaft timing chain (left-side)
- ☐ Removing and installing ⇒ ["2.5 Removing and installing camshaft timing chain", page 108](#)

# 11 - Bearing plate

- ☐ For drive chain sprocket

# 12 - Bolt

- ☐ Tightening torque ⇒ [Item 8 \(page 96\)](#)

# 13 - Drive chain sprocket

- ☐ For camshaft timing chain (left-side)

## Camshaft timing chain (right-side)

# 1 - Bolt

- ☐ Renew after removing
- ☐ 80 Nm +90°

# 2 - Camshaft adjuster

- ☐ For exhaust camshaft
- ☐ Identification: "EX"
- ☐ Removing and installing ⇒ ["2.4 Removing camshaft timing chain from camshafts", page 98](#)

# 3 - Bolt

- ☐ Tightening torque ⇒ [Item 11 \(page 96\)](#)

# 4 - Bearing mounting

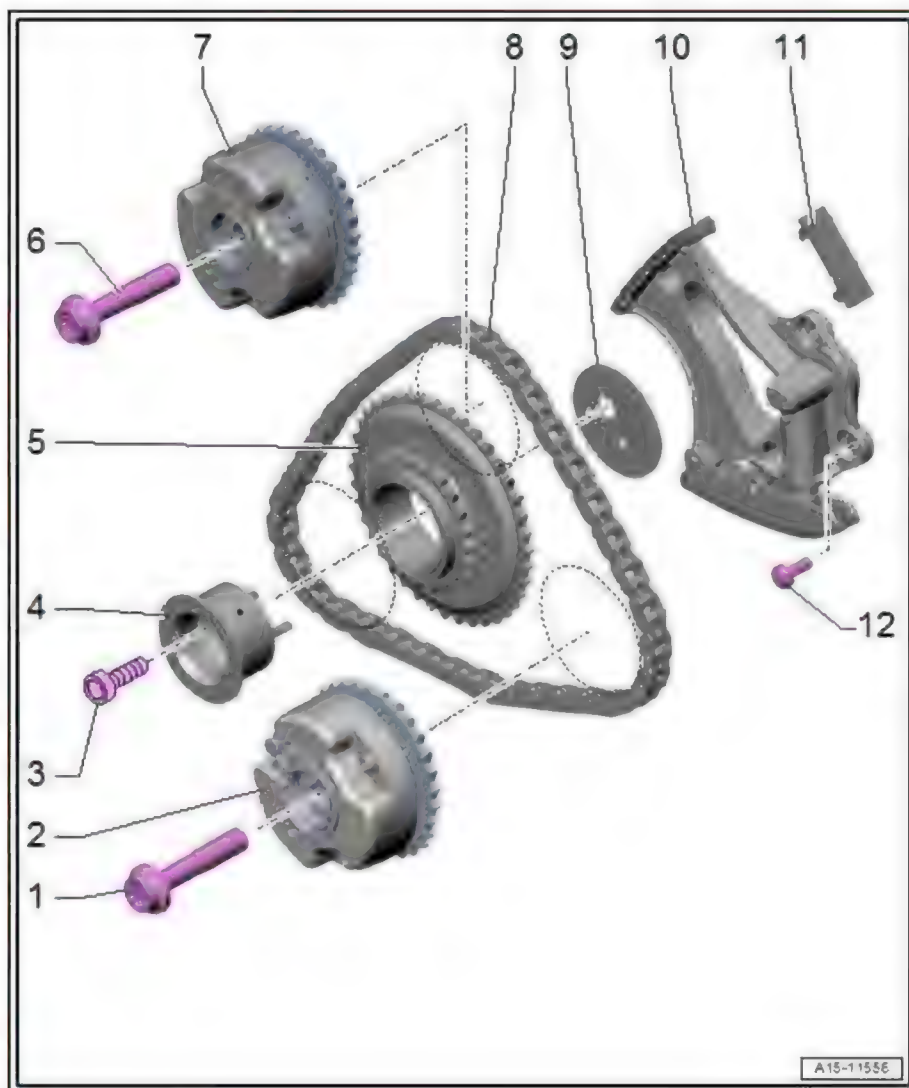
- ☐ For drive chain sprocket for camshaft timing chain (right-side)
- ☐ Asymmetric version
- ☐ Installation position ⇒ [Fig. "Installation position: bearing mounting for drive sprocket for camshaft timing chain \(right-side\)", page 97](#)

# 5 - Drive chain sprocket

- ☐ For camshaft timing chain (right-side)
- ☐ Installation position ⇒ [Fig. "Installation position: bearing mounting for drive sprocket for camshaft timing chain \(right-side\)", page 97](#)

# 6 - Bolt

- ☐ Renew after removing



- ☐ 80 Nm +90°

#### 7 - Camshaft adjuster

- ☐ For inlet camshaft
- ☐ Identification: "IN"
- ☐ Removing and installing ⇒ ["2.4 Removing camshaft timing chain from camshafts", page 98](#)

#### 8 - Camshaft timing chain (right-side)

- ☐ Mark direction of rotation for re-installation with a paint marker
- ☐ Removing from camshafts ⇒ ["2.4 Removing camshaft timing chain from camshafts", page 98](#)
- ☐ Removing and installing ⇒ ["2.5 Removing and installing camshaft timing chain", page 108](#)

#### 9 - Thrust washer

- ☐ For drive chain sprocket for camshaft timing chain (right-side)
- ☐ Asymmetric version
- ☐ Installation position  
⇒ [Fig. "Installation position: bearing mounting for drive sprocket for camshaft timing chain \(right-side\)", page 97](#)

#### 10 - Chain tensioner

- ☐ For camshaft timing chain (right-side)
- ☐ Removing and installing ⇒ ["2.5 Removing and installing camshaft timing chain", page 108](#)

#### 11 - Slide

#### 12 - Bolt

- ☐ 9 Nm



Printed by supplier. Copying for private or commercial purposes or passing on to third parties is not permitted unless authorized by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

## 2.2 Exploded view - drive chain for valve gear

1 - Guide rail

2 - Bolt

□ 16 Nm

3 - Bolt

□ 16 Nm

4 - Bolts

□ Renew after removing  
□ 5 Nm +90°

5 - Bearing mounting

□ For drive chain sprocket  
for camshaft timing  
chain (left-side)

6 - Drive chain sprocket

□ For camshaft timing  
chain (left-side)

7 - Drive chain

□ For timing drive  
□ Mark direction of rota-  
tion for re-installation  
with a paint marker  
□ Removing and installing  
⇒ ["2.6 Removing and in-  
stalling drive chain for  
valve gear", page 111](#)

8 - Bolt

□ Renew after removing  
□ 8 Nm +45°

9 - Bearing plate

□ For drive chain sprocket  
for camshaft timing  
chain (left-side)

10 - Chain sprocket for balance shaft

□ With balance weight (gearbox end)

11 - Bolt

□ 30 Nm +90°

12 - Bearing mounting

□ For drive chain sprocket for camshaft timing chain (right-side)  
□ Asymmetric version  
□ Installation position

⇒ [Fig. ""Installation position: bearing mounting for drive sprocket for camshaft timing chain \(right-side\)""](#),  
[page 97](#)

13 - Drive chain sprocket

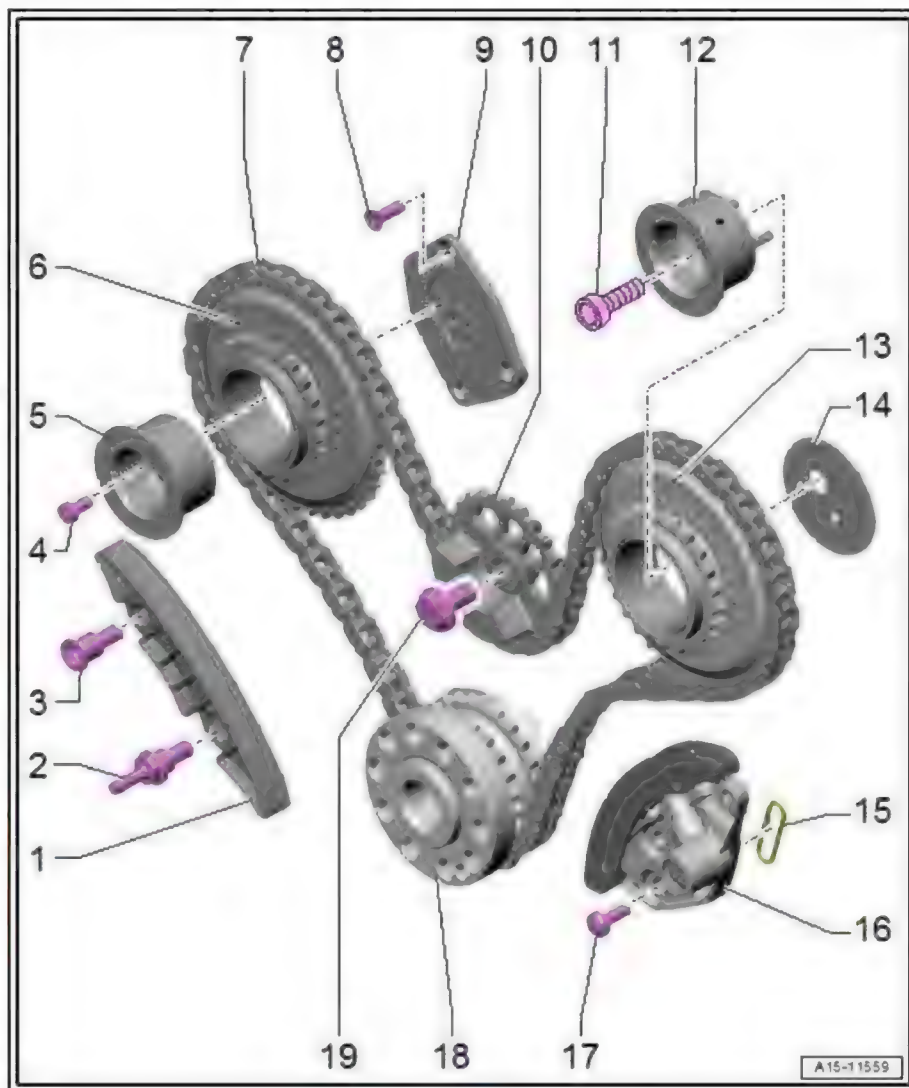
□ For camshaft timing chain (right-side)

□ Installation position

⇒ [Fig. ""Installation position: bearing mounting for drive sprocket for camshaft timing chain \(right-side\)""](#),  
[page 97](#)

14 - Thrust washer

□ For drive chain sprocket for camshaft timing chain (right-side)



- ☐ Asymmetric version
- ☐ Installation position  
⇒ [Fig. "Installation position: bearing mounting for drive sprocket for camshaft timing chain \(right-side\)", page 97](#)

15 - Seal

- ☐ Renew **after** removing

16 - Chain tensioner

- ☐ Removing and installing ⇒ ["2.6 Removing and installing drive chain for valve gear", page 111](#)

17 - Bolt

- ☐ 9 Nm

18 - Crankshaft

19 - Bolt

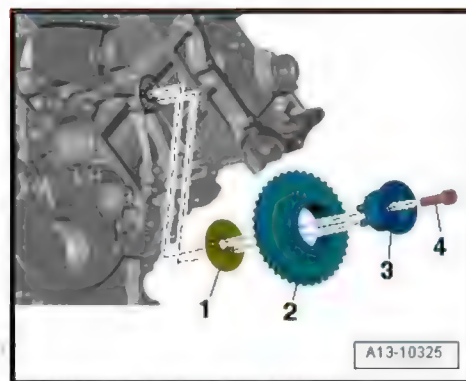
- ☐ Tightening torque ⇒ [Item 2 \(page 69\)](#)

Installation position: bearing mounting for drive sprocket for camshaft timing chain (right-side)

- Dowel pins in bearing mounting -3- for drive sprocket for camshaft timing chain (right-side) must engage in drillings in thrust washer -1- and in cylinder block drillings.

2 - Drive sprocket for camshaft timing chain (right-side)

4 - Bolt



## 2.3 Exploded view - drive chain for oil pump

### 1 - Bolt

- ☐ Renew after removing
- ☐ 30 Nm +90°

### 2 - Drive chain sprocket

- ☐ For oil pump
- ☐ Installation position:  
Side with lettering faces  
gearbox
- ☐ Can only be installed in  
one position

### 3 - Chain tensioner

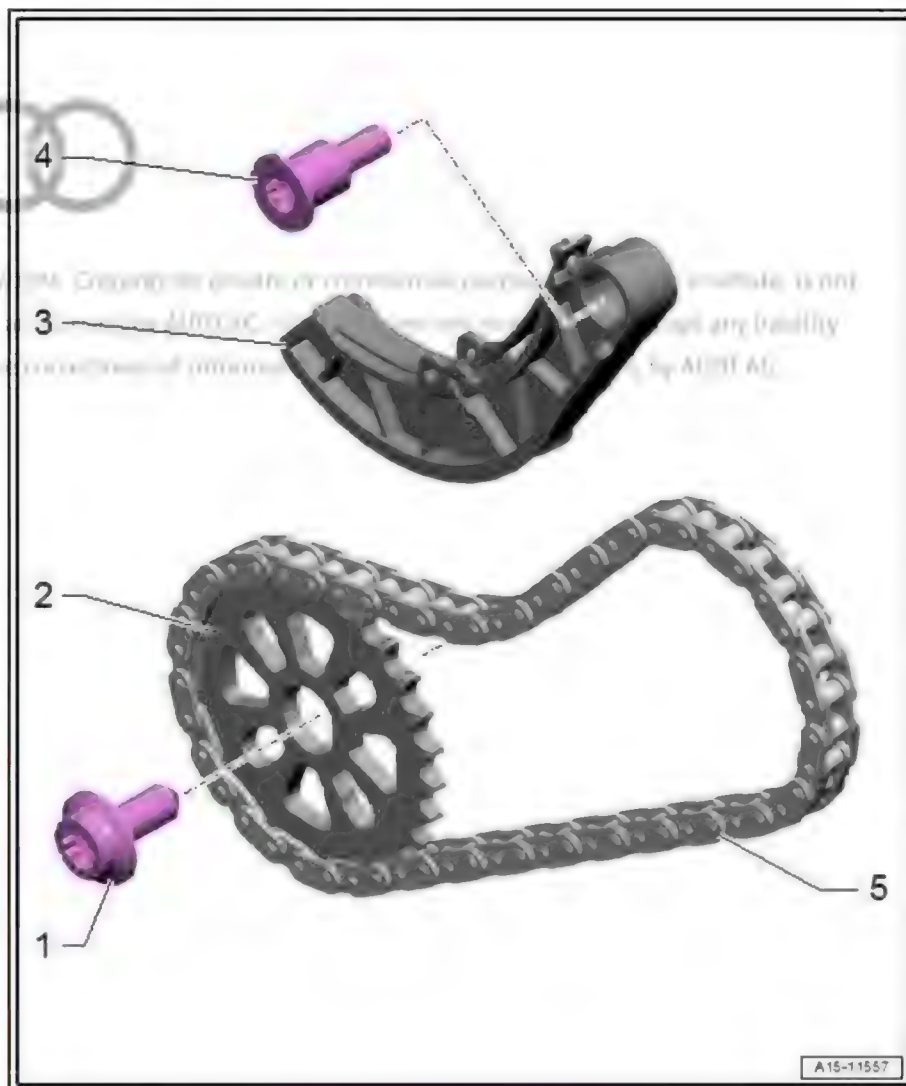
- ☐ With guide rail

### 4 - Bolt

- ☐ 20 Nm

### 5 - Drive chain

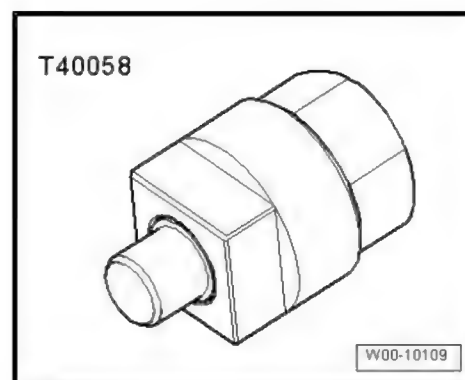
- ☐ For oil pump
- ☐ Mark direction of rota-  
tion for re-installation  
with a paint marker
- ☐ Removing and installing  
⇒ ["2.7 Removing and in-  
stalling drive chain for oil  
pump", page 113](#)



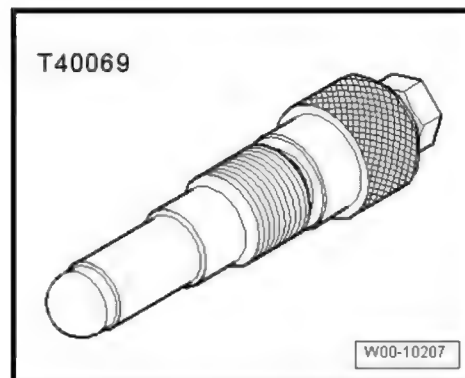
## 2.4 Removing camshaft timing chain from camshafts

Special tools and workshop equipment required

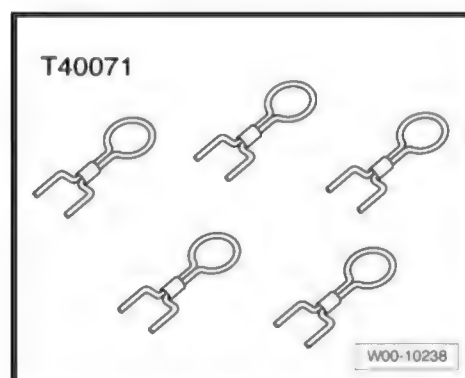
- ◆ Adapter - T40058-



◆ Locking pin - T40069-



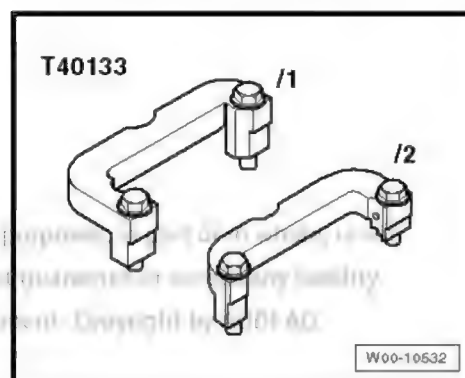
◆ 2x Locking pin - T40071-



◆ 2x Camshaft clamp - T40133-



Protected by copyright. Copying for non-commercial purposes is permitted unless authorized by Audi AG. Audi AG does not guarantee the accuracy of the information. Copyright by Audi AG.



◆ Socket -T40297-

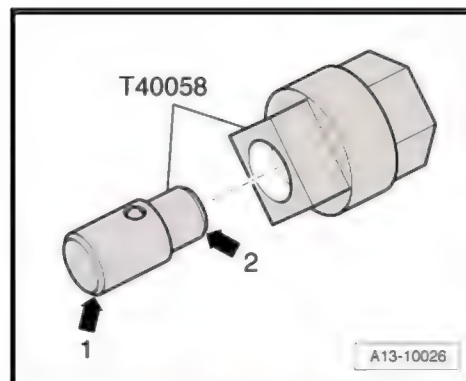
Removing



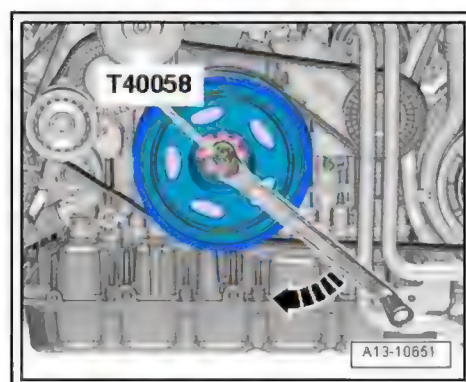
Note

- ◆ *In the following procedure the camshaft timing chains remain on the engine.*
- ◆ *Even when working on one cylinder head only, the procedure must still be carried out on both cylinder banks.*
- Remove timing chain covers (left and right)  
 ⇒ ["1.2 Removing and installing timing chain cover", page 80](#) .
- Remove cylinder head cover (left and right)  
 ⇒ ["3.3 Removing and installing cylinder head cover", page 124](#) .
- Remove noise insulation panels ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .

- Insert guide pin of adapter -T40058- as follows:
- The larger-diameter section -arrow 1- faces towards the engine.
- The smaller-diameter section -arrow 2- faces the adapter.

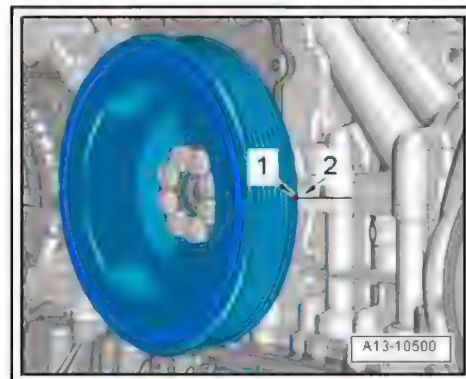


- Use adapter - T40058- and angled ring spanner to turn crankshaft in direction of engine rotation -arrow- to "TDC".



#### Note

- ♦ Turn the engine until the small notch -1- on the vibration damper is in line with the joint -2- between the cylinder block and the retaining frame on the left side (as seen in direction of travel). This makes it easier to screw in locking pin - T40069- in a later step.
- ♦ The marking on the vibration damper is only a visual aid. The exact "TDC" position can only be obtained by screwing in the locking pin - T40069-.

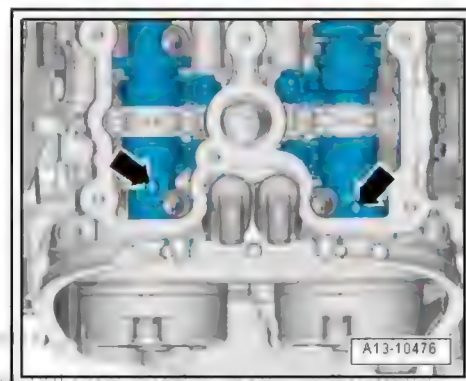


- Threaded holes -arrows- in all camshafts must face upwards.



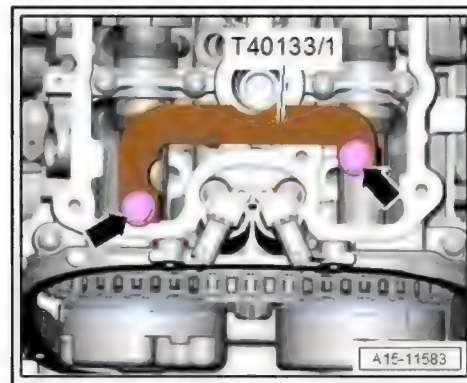
#### Note

If camshafts are not positioned as described, turn crankshaft one rotation further and return to TDC position.



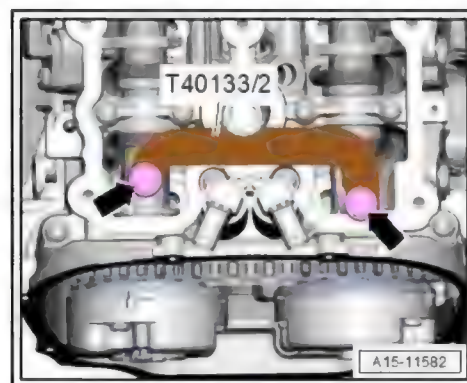
#### Cylinder bank 1 (right-side):

- Fit camshaft clamp - T40133/1- onto cylinder head -arrows- and tighten to 25 Nm.



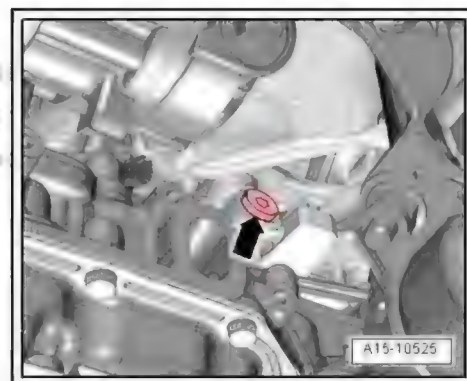
#### Cylinder bank 2 (left-side):

- Fit camshaft clamp - T40133/2- onto cylinder head -arrows- and tighten to 25 Nm.

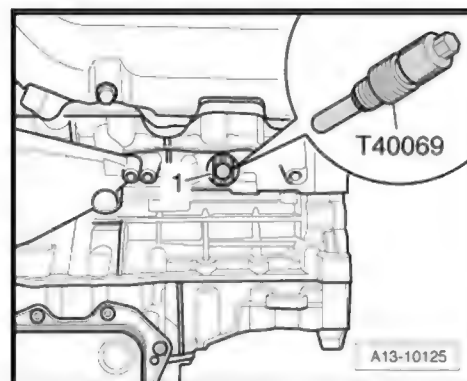


#### Continued for both cylinder banks:

- Remove plug -arrow- for crankshaft "TDC" marking from cylinder block.



- Screw locking pin - T40069- into hole (20 Nm); if necessary, turn crankshaft -1- backwards and forwards slightly to fully centralise locking pin.



### Cylinder bank 1 (right-side):

- Press guide rail of chain tensioner for camshaft timing chain (right-side) inwards as far as the stop using a screwdriver -1-. Then lock chain tensioner by inserting locking pin - T40071- .



#### Note

The chain tensioner is oil-damped and can therefore only be compressed slowly by applying constant pressure.

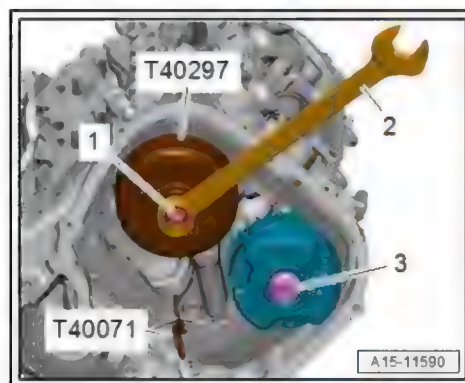


#### Caution

Risk of damage to camshafts.

- ◆ Do NOT use camshaft clamp - T40133- to counterhold when loosening bolt for camshaft adjuster or camshaft chain sprocket.

- Apply socket -T40297- with ring spanner -2- to counterhold at corresponding camshaft adjuster.
- Loosen bolt -1- for camshaft adjuster (inlet side).
- Loosen bolt -3- for camshaft adjuster (exhaust side) by counterholding with socket -T40297- as well.

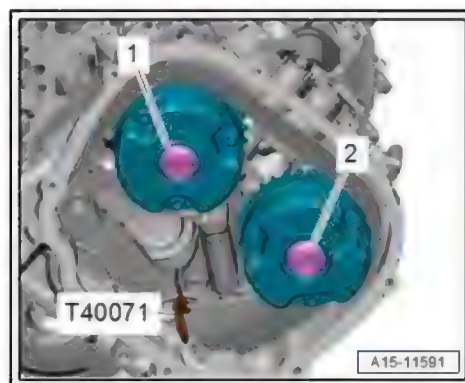


#### Caution

Risk of irreparable damage to engine.

- ◆ Block off the opening in the valve timing housing with a clean cloth to prevent small items from dropping into the engine.

- Mark position of camshaft adjusters with paint for re-installation.
- Unscrew bolts -1 and 2- and detach both camshaft adjusters.



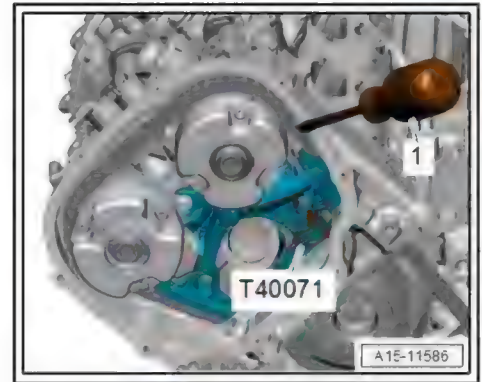
Cylinder bank 2 (left-side):

- Press guide rail of chain tensioner for camshaft timing chain (left-side) inwards as far as the stop using a screwdriver -1-. Then lock chain tensioner by inserting locking pin - T40071-.



Note

*The chain tensioner is oil-damped and can therefore only be compressed slowly by applying constant pressure.*

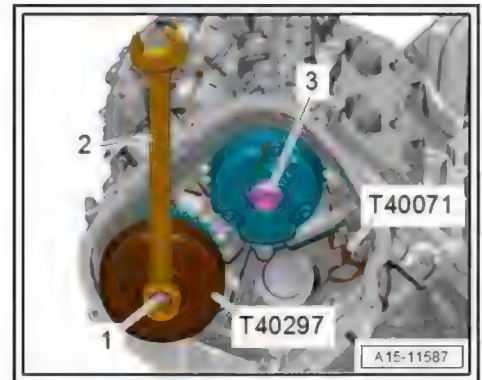


Caution

*Risk of damage to camshafts.*

- ◆ *Do NOT use camshaft clamp - T40133- to counterhold when loosening bolt for camshaft adjuster or camshaft chain sprocket.*

- Apply socket -T40297- with ring spanner -2- to counterhold at corresponding camshaft adjuster.
- Loosen bolt -1- for camshaft adjuster (exhaust side).
- Loosen bolt -3- for camshaft adjuster (inlet side) by counterholding with socket -T40297- as well.



Caution

*Risk of irreparable damage to engine.*

- ◆ *Block off the opening in the valve timing housing with a clean cloth to prevent small items from dropping into the engine.*

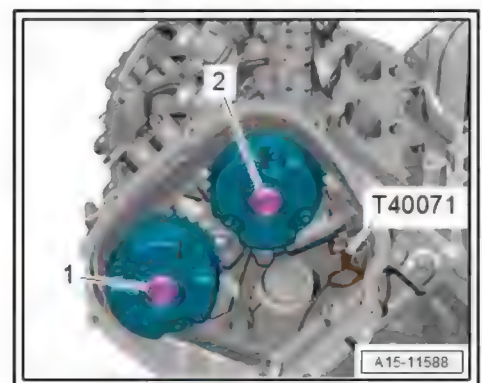
- Mark position of camshaft adjusters with paint for re-installation.
- Unscrew bolts -1 and 2- and detach both camshaft adjusters.

Installing



Note

*Renew bolts tightened with specified tightening angle.*



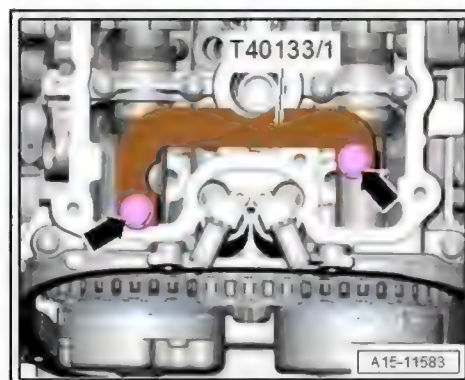
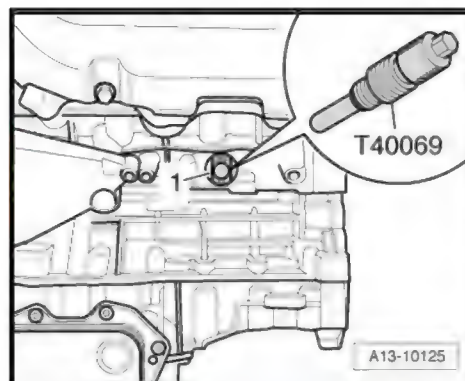
Caution

*Risk of damage to valves and piston crowns.*

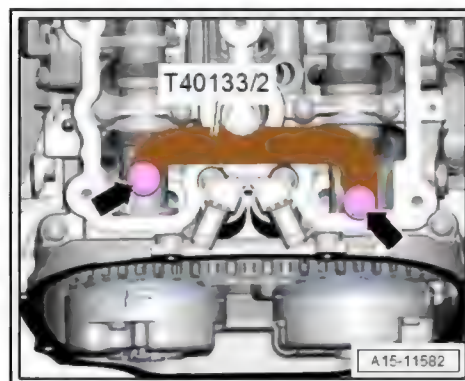
- ◆ *The crankshaft must not be at "TDC" at any cylinder when the camshafts are turned.*

*Note: All the copyright, copy or the picture or content of this publication is for the exclusive use of the publisher. All rights are reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without the prior written permission of the publisher. All rights reserved. Copyright © 2018 by AUDI AG.*

- Drive chain for valve gear installed  
⇒ ["2.6 Removing and installing drive chain for valve gear", page 111](#)
- Crankshaft -1- locked in "TDC" position with locking pin - T40069- .



- Camshaft clamp -T40133/1- installed on cylinder bank 1 (right-side) and tightened to 25 Nm -arrows-.
- Camshaft clamp -T40133/2- installed on cylinder bank 2 (left-side) and tightened to 25 Nm -arrows-.



Cylinder bank 1 (right-side):

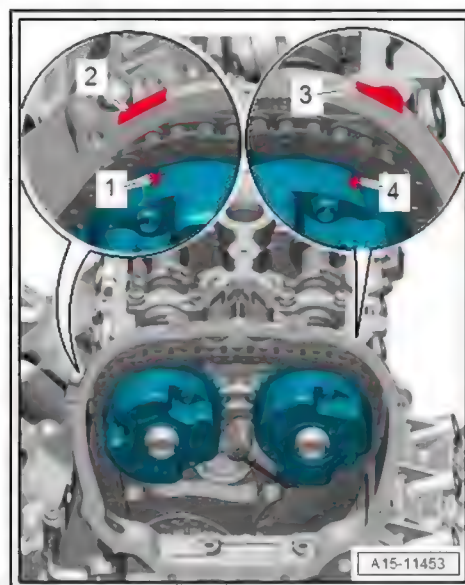


Caution

*Risk of damage to engine.*

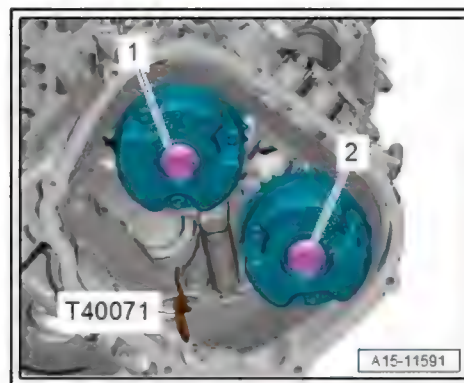
- ◆ *The camshaft adjusters MUST be installed as described in the following work steps:*

- Fit camshaft adjusters according to marks applied during removal.
- Groove -1- or -4- on camshaft adjuster should align with corresponding adjustment window -2- or -3-.



Protected by copyright - copying for private or commercial purposes is permitted unless authorized by AUDI AG. AUDI AG does not guarantee the accuracy with respect to the correctness of information in this document. (AUDI AG)

- Fit camshaft adjusters according to marks applied during removal.
- Fit timing chain onto drive chain sprocket and camshaft adjusters and fit bolts -1 and 2- without tightening.
- It should just be possible to turn both camshaft adjusters on the camshaft without axial movement.
- Remove locking pin - T40071- .



Cylinder bank 2 (left-side):

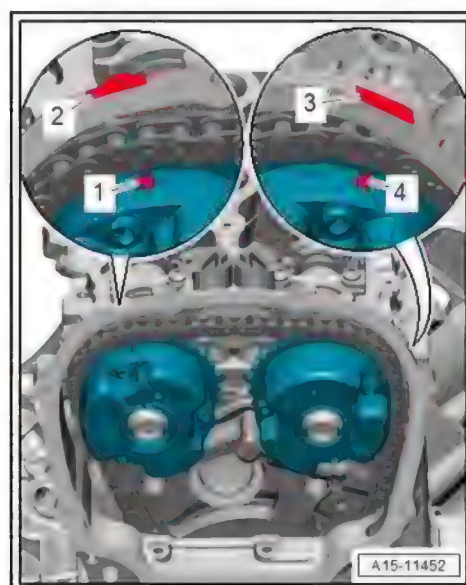


Caution

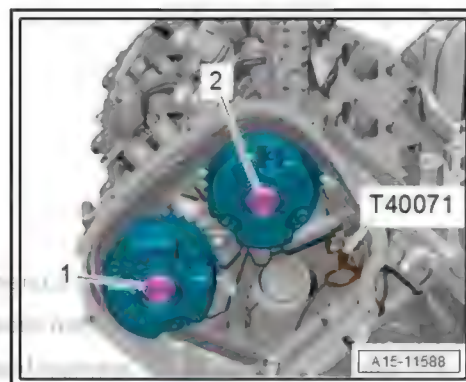
*Risk of damage to engine.*

- ◆ *The camshaft adjusters MUST be installed as described in the following work steps:*

- Fit camshaft adjusters according to marks applied during removal.
- Groove -1- or -4- on camshaft adjuster should align with corresponding adjustment window -2- or -3-.



- Fit camshaft adjusters according to marks applied during removal.
- Fit timing chain onto drive chain sprocket and camshaft adjusters and fit bolts -1 and 2- without tightening.
- It should just be possible to turn both camshaft adjusters on the camshaft without axial movement.
- Remove locking pin - T40071- .



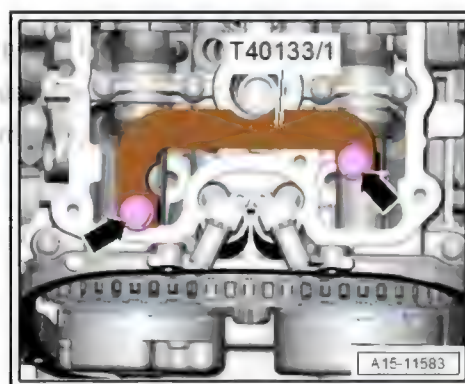
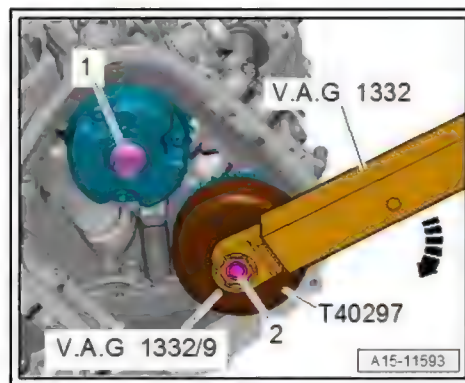
Protected by copyright. Copying for private or commercial use is prohibited without the written permission of AUDI AG. AUDI AG is not responsible for the content of this document.

### Cylinder bank 1 (right-side):

- Fit socket -T40297- onto camshaft adjuster of exhaust camshaft.
- Apply torque wrench - V.A.G 1332- with open ring spanner insert - V.A.G 1332/9- to socket -T40297- .
- Have a second mechanic apply a torque of 40 Nm to camshaft adjuster in direction of -arrow-.
- Tighten bolts as follows while keeping camshaft adjuster under tension:

Stage	Bolt	Tightening torque
1.	-1-	At camshaft: 60 Nm
1.	-2-	At camshaft: 60 Nm

- Remove socket -T40297- .
- Remove camshaft clamp -T40133/1- -arrows-.

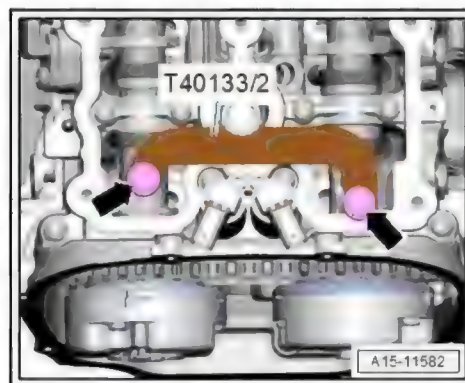
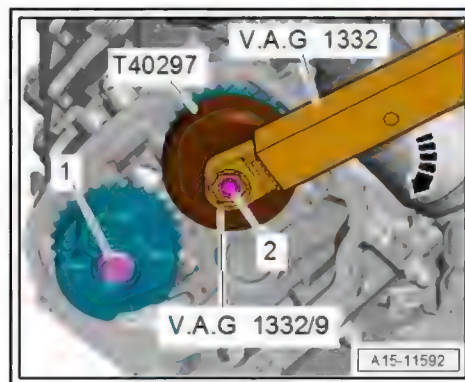


### Cylinder bank 2 (left-side):

- Fit socket -T40297- onto camshaft adjuster of inlet camshaft.
- Apply torque wrench - V.A.G 1332- with open ring spanner insert - V.A.G 1332/9- to socket -T40297- .
- Have a second mechanic apply a torque of 40 Nm to camshaft adjuster in direction of -arrow-.
- Tighten bolts as follows while keeping camshaft adjuster under tension:

Stage	Bolt	Tightening torque
1.	-1-	At camshaft: 60 Nm
1.	-2-	At camshaft: 60 Nm

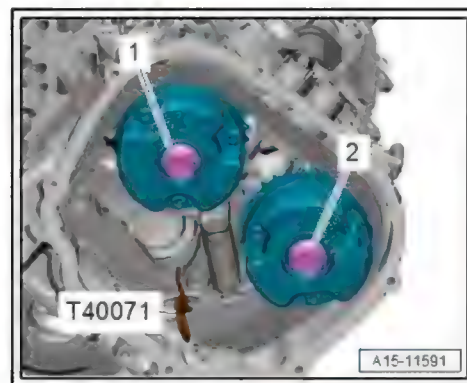
- Remove socket -T40297- .
- Remove camshaft clamp -T40133/2- -arrows-.



#### Cylinder bank 1 (right-side):

- Tighten camshaft adjuster bolts on cylinder head (right-side) as follows:

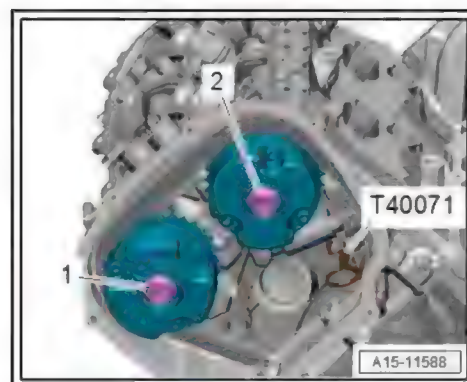
Stage	Bolt	Tightening torque
2.	-1-	Tighten on camshaft to final tightening torque ⇒ "2.1 Exploded view - camshaft timing chains", page 93
2.	-2-	Tighten on camshaft to final tightening torque ⇒ "2.1 Exploded view - camshaft timing chains", page 93



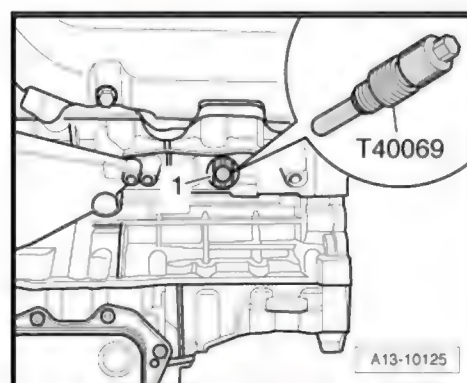
#### Cylinder bank 2 (left-side):

- Tighten camshaft adjuster bolts on cylinder head (left-side) as follows:

Stage	Bolt	Tightening torque
2.	-1-	Tighten on camshaft to final tightening torque ⇒ "2.1 Exploded view - camshaft timing chains", page 93
2.	-2-	Tighten on camshaft to final tightening torque ⇒ "2.1 Exploded view - camshaft timing chains", page 93



- Remove locking pin - T40069- .

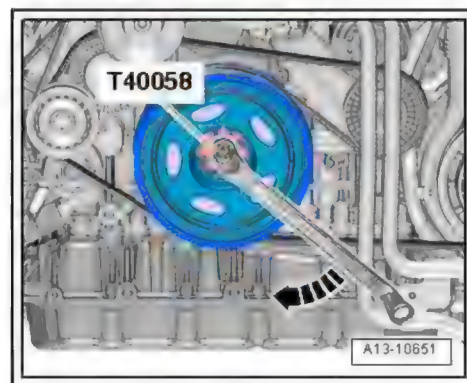


- Using adapter - T40058- and angled ring spanner, turn crankshaft 2 revolutions in normal direction of rotation -arrow- until crankshaft is at "TDC" again.



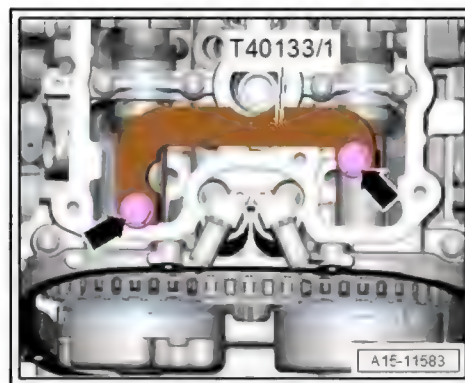
#### Note

*If you turn the crankshaft beyond "TDC" by mistake, turn it back approx. 30° and set to "TDC" again.*



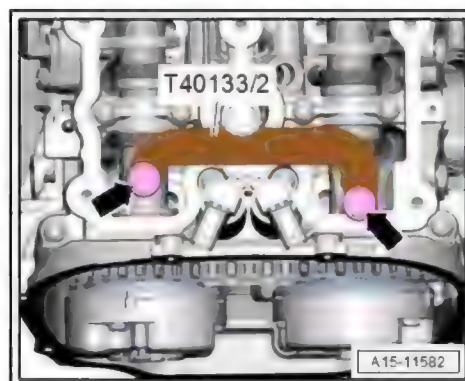
### Cylinder bank 1 (right-side):

- Fit camshaft clamp -T40133/1- on cylinder head and tighten -arrows-.
- Tightening torque: 25 Nm



### Cylinder bank 2 (left-side):

- Fit camshaft clamp -T40133/2- on cylinder head and tighten -arrows-.
- Tightening torque: 25 Nm

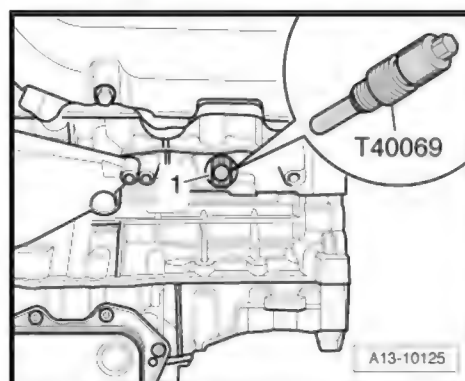


### Continued for both cylinder banks:

- Screw the locking pin - T40069- directly into the hole.
- The locking pin - T40069- must engage in the locating hole in crankshaft -1-. If it does not, reset valve timing.
- Remove camshaft clamps from both cylinder heads.
- Remove locking pin.

Remaining installation steps are carried out in reverse sequence; note the following:

- Install cylinder head cover  
⇒ ["3.3 Removing and installing cylinder head cover", page 124](#).
- Install timing chain covers (left and right)  
⇒ ["1.2.1 Removing and installing timing chain cover \(left-side\)", page 80](#).



### Tightening torques

- ◆ ⇒ ["2.1 Exploded view - camshaft timing chains", page 93](#)
- ◆ ⇒ [Fig. "Plug for TDC marking - tightening torque", page 63](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

## 2.5 Removing and installing camshaft timing chain

### Removing

- Gearbox removed:
- ◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Removing and installing gearbox

- ◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Removing and installing gearbox

– Remove timing chain cover (bottom)

⇒ ["1.2.3 Removing and installing timing chain cover \(bottom\)", page 86](#).

– Remove timing chains from camshafts

⇒ ["2.4 Removing camshaft timing chain from camshafts", page 98](#).

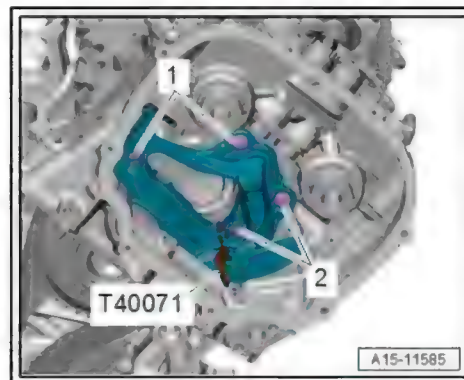
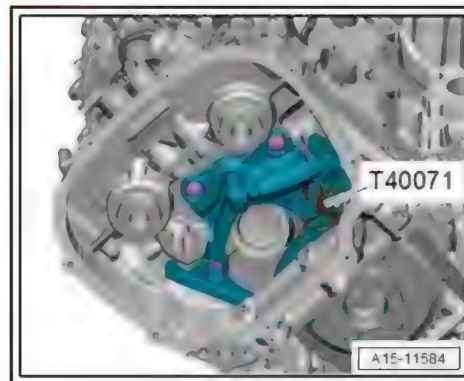


**Caution**

*If a used timing chain rotates in the opposite direction when it is refitted, this can cause breakage.*

- ◆ *Mark running direction of timing chains (left and right) with paint for re-installation. Do not attempt to mark the timing chain with a centre punch or by making a notch or similar.*

- Remove locking pin - T40071- and detach camshaft timing chain (left-side).
- Remove bolts -1, 2- and take off chain tensioner (right-side).



- Press guide rail of chain tensioner for drive chain for valve gear in direction of -arrow- and lock chain tensioner by inserting locking pin - T40071- .
- Remove bolt -1- securing bearing mounting for drive chain sprocket.
- Pull off drive sprocket with bearing mounting and lift off camshaft timing chain (right-side).

#### Installing



#### Note

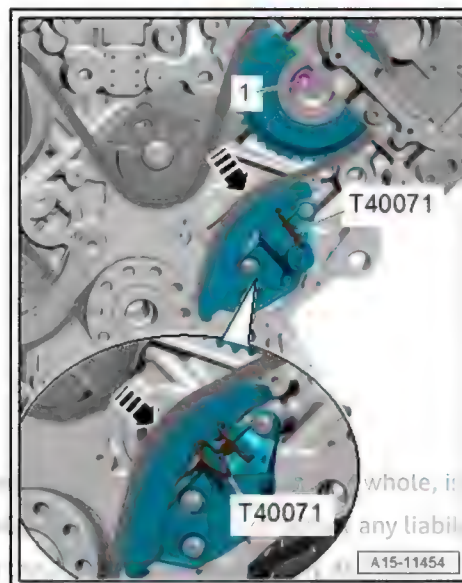
- ♦ *Note the correct installation position if the tensioning element has been removed from the chain tensioner: drilling in base of housing faces chain tensioner and piston faces tensioner rail.*
- ♦ *Renew bolts tightened with specified tightening angle.*



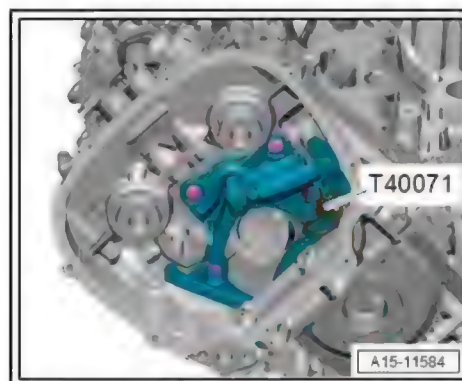
#### Caution

*Risk of damage to valves and piston crowns.*

- ♦ *The crankshaft must not be at "TDC" at any cylinder when the camshafts are turned.*



- Fit camshaft timing chain (left-side) on drive chain sprocket according to marks made upon removal and guide chain upwards to cylinder head.
- Press down guide rail of chain tensioner for timing chain (left-side) and lock chain tensioner by inserting locking pin - T40071- .

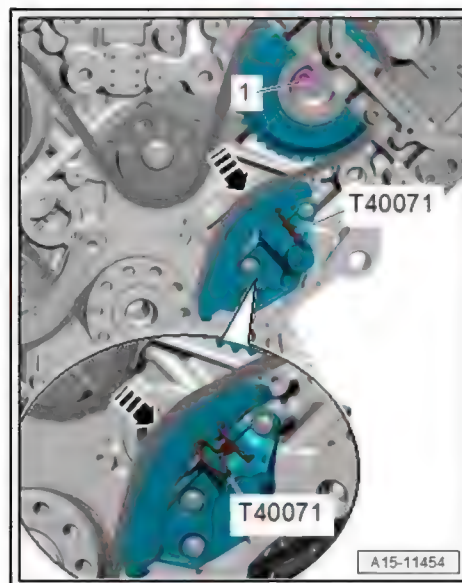


- Fit camshaft timing chain (right-side) on drive chain sprocket according to marks made upon removal and guide chain upwards to cylinder head.
- Install drive sprocket  
⇒ Fig. "Installation position: bearing mounting for drive sprocket for camshaft timing chain (right-side)", page 97 .
- Tighten bolt -1- securing bearing mounting for drive chain sprocket.
- Remove locking pin - T40071- .



#### Note

*Disregard -arrow-.*



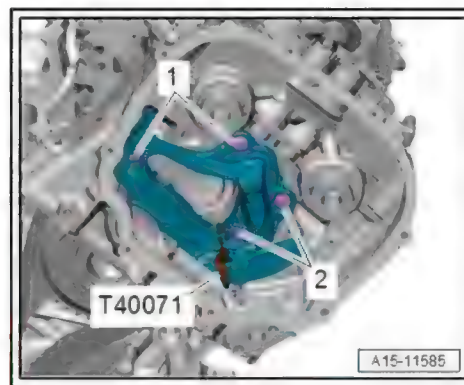
- Fit chain tensioner on cylinder head (right-side).
- Tighten bolts -1- and -2-.

Remaining installation steps are carried out in reverse sequence; note the following:

- Fit timing chains on camshafts ➔ [page 103](#) .
- Install timing chain cover (bottom)  
➔ ["1.2.3 Removing and installing timing chain cover \(bottom\)", page 86](#) .

Tightening torques

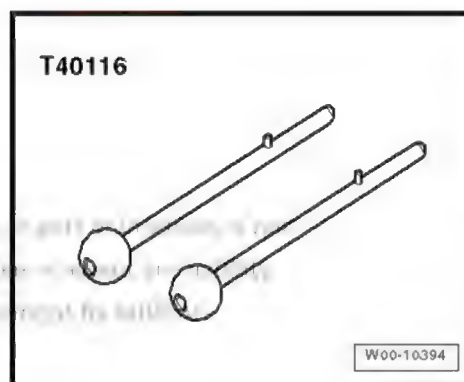
- ◆ ➔ ["2.1 Exploded view - camshaft timing chains", page 93](#)



## 2.6 Removing and installing drive chain for valve gear

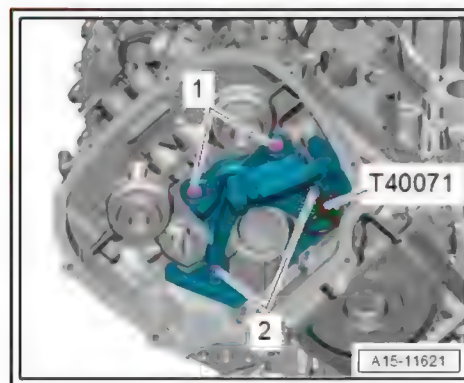
Special tools and workshop equipment required

- ◆ Locating pins - T40116-



Removing

- Gearbox removed:
- ◆ ➔ 7-speed dual clutch gearbox; Rep. gr. 34 ; Removing and installing gearbox
- ◆ ➔ 8-speed automatic gearbox; Rep. gr. 37 ; Removing and installing gearbox
- Remove timing chain cover (bottom)  
➔ ["1.2.3 Removing and installing timing chain cover \(bottom\)", page 86](#) .
- Remove timing chains  
➔ ["2.5 Removing and installing camshaft timing chain", page 108](#) .
- Remove bolts -1 and 2- and take off chain tensioner.



- Remove drive chain for auxiliary drives  
⇒ ["2.7 Removing and installing drive chain for oil pump", page 113](#).



### Caution

If a used drive chain rotates in the opposite direction when it is refitted, this can cause breakage.

- ♦ Mark running direction of drive chain with coloured arrows for re-installation.

- Unscrew bolts -1- and remove guide rail.
- Remove bolts -2- and take off chain tensioner.
- Detach drive chain for valve gear.

### Installing

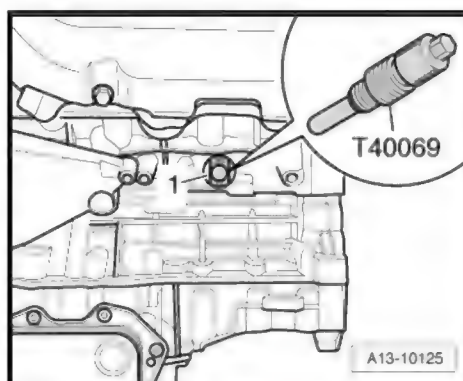
Installation is carried out in reverse order; note the following:



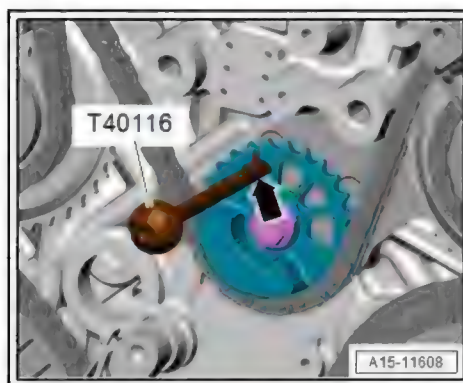
### Note

Renew bolts tightened with specified tightening angle.

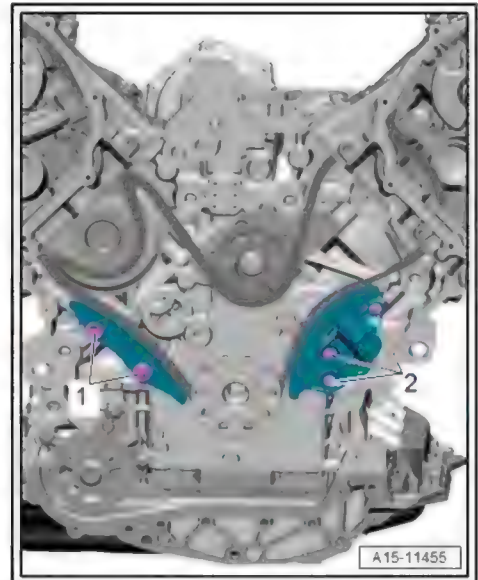
- Crankshaft -1- locked in "TDC" position with locking pin - T40069-.



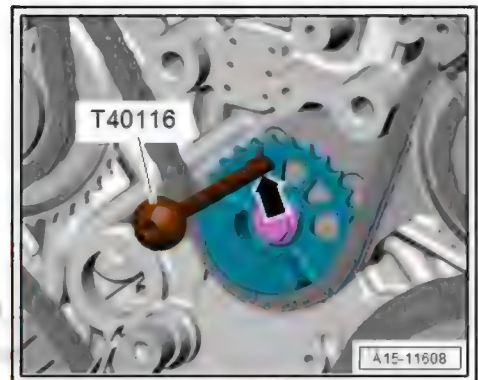
- Lock balance shaft sprocket in "TDC" position by inserting locating pin -T40116- in adjustment window -arrow- of sprocket.
- Position drive chain for valve gear onto drive chain sprockets (according to marks applied during removal).



- Install guide rail and tighten bolts -1-.
- Install chain tensioner and tighten bolts -2-.



- Locating pin -T40116- must be positioned in approximate centre of adjustment window -arrow- in balance shaft sprocket.
- Locating pin must NOT make contact on left or right side. If necessary, adjust drive chain by one tooth.
- Install drive chain for auxiliary drives  
 ⇒ ["2.7 Removing and installing drive chain for oil pump", page 113](#) .
- Install camshaft timing chains  
 ⇒ ["2.5 Removing and installing camshaft timing chain", page 108](#) .
- Install timing chain cover (bottom)  
 ⇒ ["1.2.3 Removing and installing timing chain cover \(bottom\)", page 86](#) .



#### Tightening torques

- ◆ ⇒ ["2.2 Exploded view - drive chain for valve gear", page 96](#)

## 2.7 Removing and installing drive chain for oil pump

Special tools and workshop equipment required

- ◆ Locking pin - T40071-



#### Removing

- Gearbox removed:
- ◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Removing and installing gearbox

- ◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Removing and installing gearbox
- Remove timing chain cover (bottom)  
⇒ ["1.2.3 Removing and installing timing chain cover \(bottom\)"](#), page 86 .
- Use pliers to press down chain tensioner spring -arrows- and lock in place by inserting locking pin - T40071- .



#### Caution

*If a used drive chain rotates in the opposite direction when it is refitted, this can cause breakage.*

- ◆ *Mark running direction of drive chain with paint for re-installation. Do not attempt to mark the drive chain with a centre punch or by making a notch or similar.*

- Remove bolt -1- and take off chain tensioner.
- Counterhold chain sprocket with a screwdriver -2- and remove bolt -1-.
- Detach drive chain with chain sprocket.

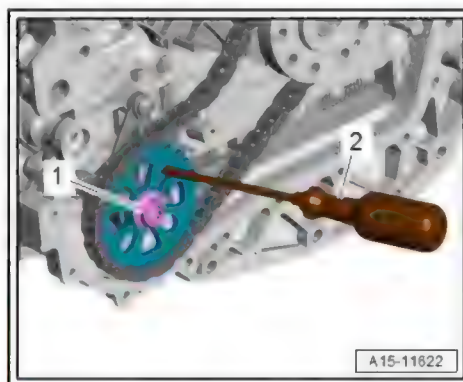
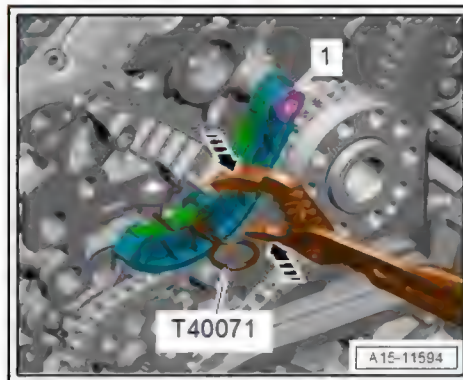
#### Installing

Installation is carried out in reverse order; note the following:

- Install timing chain cover (bottom)  
⇒ ["1.2.3 Removing and installing timing chain cover \(bottom\)"](#), page 86 .

#### Tightening torques

- ◆ ⇒ ["2.3 Exploded view - drive chain for oil pump"](#), page 98



*This document is copyrighted by Audi AG. All rights reserved. No part of this document may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without prior written permission from Audi AG. Audi AG is not responsible for any errors or omissions in this document. Copyright by Audi AG.*

### 3 Cylinder head

⇒ ["3.1 Exploded view - cylinder head", page 115](#)

⇒ ["3.2 Removing and installing cylinder head", page 117](#)

⇒ ["3.3 Removing and installing cylinder head cover", page 124](#)

⇒ ["3.4 Checking compression", page 126](#)

#### 3.1 Exploded view - cylinder head



Note

*Illustration shows the cylinder head for cylinder bank 2 (left-side) as an example.*

##### 1 - Cylinder head gasket

- ☐ Renewing  
⇒ ["3.2 Removing and installing cylinder head", page 117](#)
- ☐ Installation position:  
part number must face  
cylinder head
- ☐ If renewed, change  
coolant and engine oil

##### 2 - Cylinder head

- ☐ Removing and installing  
⇒ ["3.2 Removing and installing cylinder head", page 117](#)
- ☐ Checking for distortion  
⇒ Fig. ["Checking cylinder head for distortion", page 117](#)
- ☐ Machining limit  
⇒ Fig. ["Cylinder head machining limit", page 117](#)
- ☐ If renewed, change  
coolant and engine oil

##### 3 - Bolt

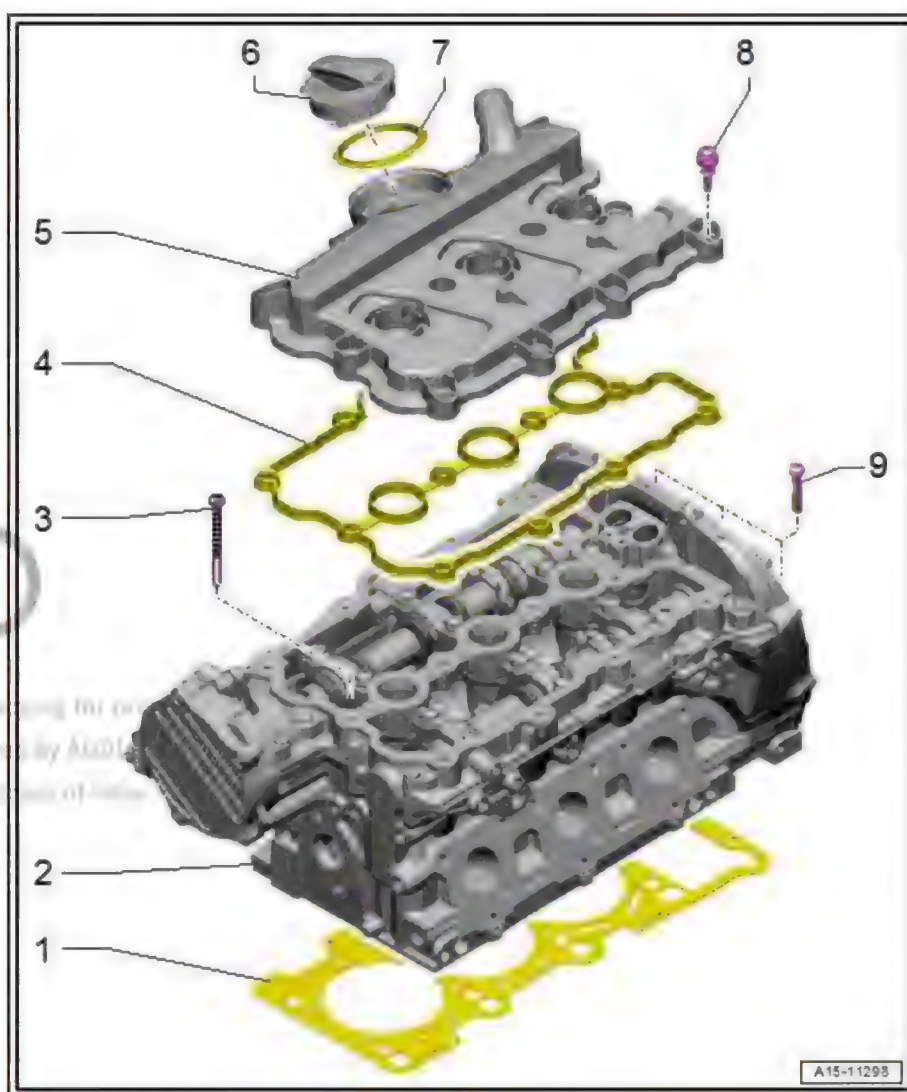
- ☐ Renew after removing
- ☐ Note correct sequence  
when loosening  
⇒ [page 119](#)
- ☐ Tightening torque and  
sequence  
⇒ Fig. ["Cylinder head - tightening torque and sequence", page 116](#)

##### 4 - Gasket

- ☐ For cylinder head cover
- ☐ Renew if damaged or leaking

##### 5 - Cylinder head cover

- ☐ Removing and installing ⇒ ["3.3 Removing and installing cylinder head cover", page 124](#)



6 - Filler cap

7 - Seal

☐ Renew if damaged or leaking

8 - Bolt

☐ Renew if seal is damaged

☐ Tightening torque and sequence:

◆ ⇒ Fig. [“Cylinder head cover \(left-side\) - tightening torque and sequence”](#) , page 116

◆ ⇒ Fig. [“Cylinder head cover \(right-side\) - tightening torque and sequence”](#) , page 116

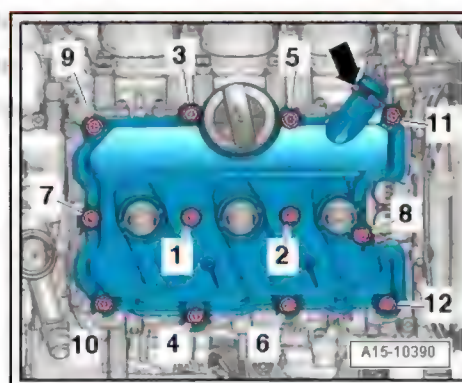
9 - Bolt

☐ Tightening torque and sequence

⇒ Fig. [“Timing chain cover \(bottom\) - tightening torque and tightening sequence”](#) , page 80

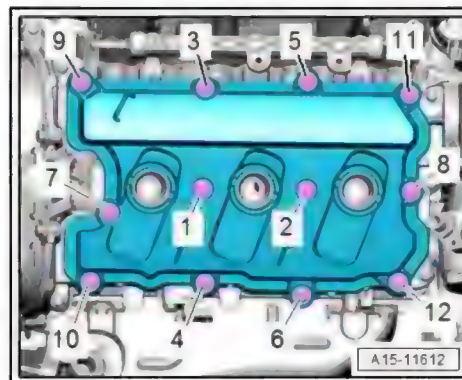
Cylinder head cover (left-side) - tightening torque and sequence

– Tighten bolts in the sequence -1 ... 12- to 9 Nm.



Cylinder head cover (right-side) - tightening torque and sequence

– Tighten bolts in the sequence -1 ... 12- to 9 Nm.



Cylinder head - tightening torque and sequence

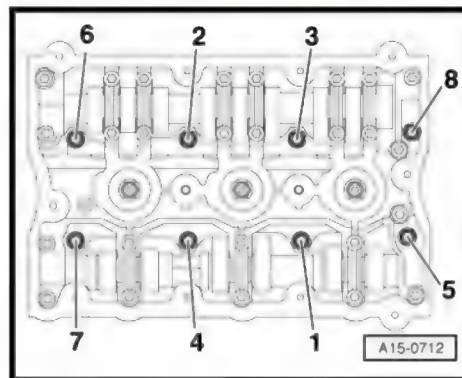


Note

*Renew bolts tightened with specified tightening angle.*

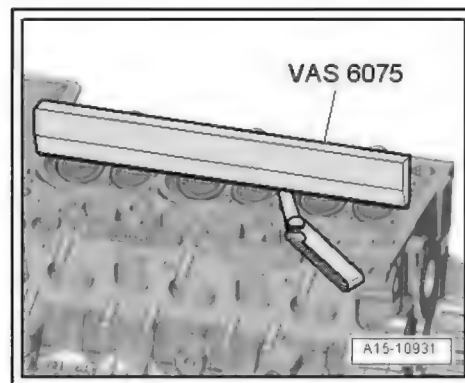
– Tighten bolts in stages in the sequence shown:

Stage	Bolts	Tightening torque/angle specification
1.	-1 ... 8-	Screw in by hand until contact is made
2.	-1 ... 8-	40 Nm
3.	-1 ... 8-	Turn 90° further
4.	-1 ... 8-	Turn 90° further



#### Checking cylinder head for distortion

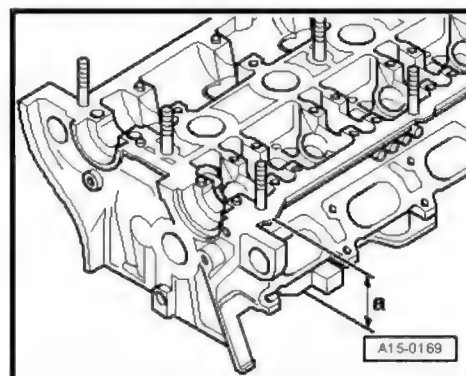
- Use straight edge 500 mm - VAS 6075- and feeler gauge to measure cylinder head for distortion at several points.
- Maximum distortion: 0.05 mm



#### Cylinder head machining limit

Machining of the cylinder head (surface grinding) is only permissible down to the minimum dimension -a-.

- Minimum dimension: -a- = 139.20 mm



## 3.2 Removing and installing cylinder head

⇒ ["3.2.1 Removing and installing cylinder head, bank 1 \(right-side\)", page 117](#)

⇒ ["3.2.2 Removing cylinder head - bank 2 \(left-side\)", page 119](#)

⇒ ["3.2.3 Installing cylinder head", page 122](#)

### 3.2.1 Removing and installing cylinder head, bank 1 (right-side)

Special tools and workshop equipment required

- ◆ Socket XZN M12 (at least 75 mm), commercially available
- ◆ Engine bung set - VAS 6122-



#### Procedure

- Engine in vehicle.



by cop  
 Note

*Re-install all cable ties in the same locations when installing.*

- Remove coolant pipe (front right)  
⇒ ["3.2.3 Removing and installing coolant pipe \(front right\)"](#),  
[page 211](#) .
- Remove coolant pipe (top)  
⇒ ["3.2.5 Removing and installing coolant pipe \(top\)"](#),  
[page 216](#) .



# WARNING

*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

- Put on safety goggles.
- Put on protective gloves.
- Release pressure (wrap a clean cloth around connection and open connection carefully).

- Disconnect fuel hose -1- ⇒ Fuel supply system; Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .
- Seal off open lines and connections with plugs (thoroughly cleaned) from engine bung set - VAS 6122- .
- Remove camshafts (right-side)  
⇒ ["4.4 Removing and installing camshaft"](#), [page 134](#) .

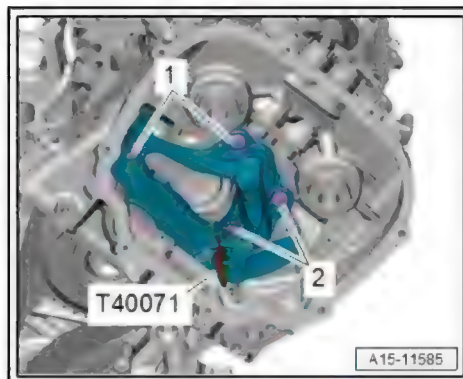
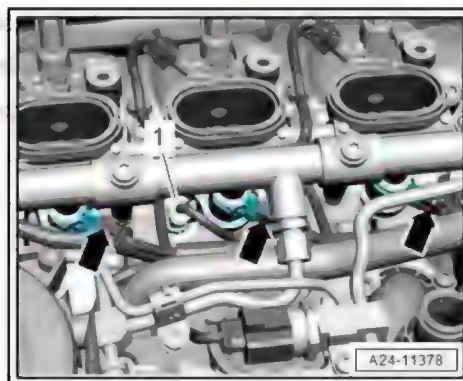
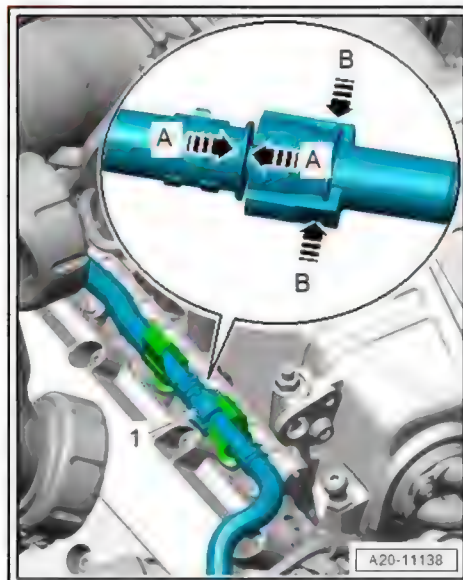
- Unplug electrical connectors -arrows- at injectors.
- Unplug electrical connector -1- at temperature sender for engine temperature regulation - G694-

- Remove bolts -1, 2- and take chain tensioner off cylinder head.

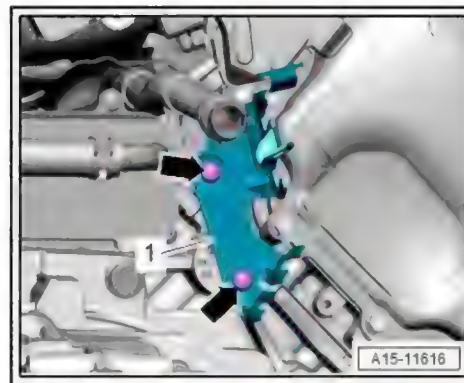


# Note

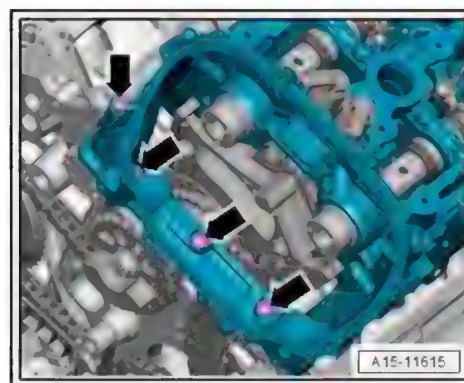
*Locking pin - T40071- remains in place.*



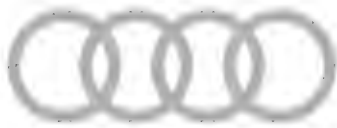
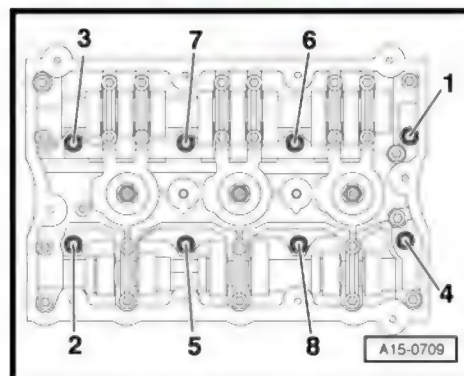
- Unscrew bolts -arrows- and detach bracket -1-.



- Remove bolts -arrows- at rear of cylinder head.



- Slacken cylinder head bolts in the sequence -1 ... 8-.
- Unscrew bolts, detach cylinder head and set it down on a soft surface (foam plastic).



### 3.2.2 Removing cylinder head - bank 2 (left-side)

Special tools and workshop equipment required

- ◆ Socket XZN M12 (at least 75 mm), commercially available

Procedure

- Engine in vehicle.



Note

*Re-install all cable ties in the same locations when installing.*

- Remove fuel line for MPI injection system  
 ⇒ ["4.5 Removing and installing fuel line", page 303](#) .
- Remove camshafts (left-side)  
 ⇒ ["4.4 Removing and installing camshaft", page 134](#) .

- Remove coolant pipe (front left)  
⇒ "3.2.1 Removing and installing coolant pipe (front left)", page 208.
- Unplug electrical connectors -1, 3- at injectors.
- Unplug electrical connector -4- at fuel pressure sender - G247-.

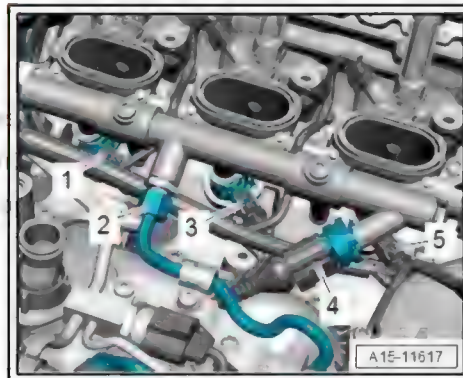


**WARNING**

*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

- Put on safety goggles.
- Put on protective gloves.
- Release pressure (wrap a clean cloth around connection and open connection carefully).



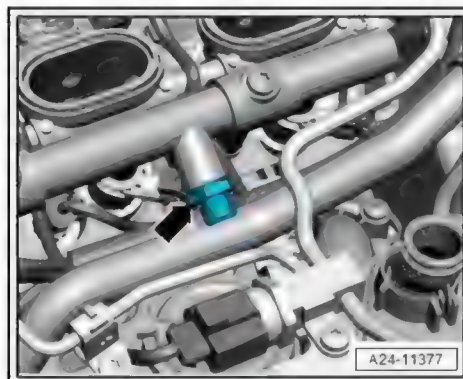
- Remove union nut -2-.



**Note**

*Electrical connector -5- is unplugged in a later step.*

- If connection -arrow- has been unfastened or unbolted, it must be renewed.

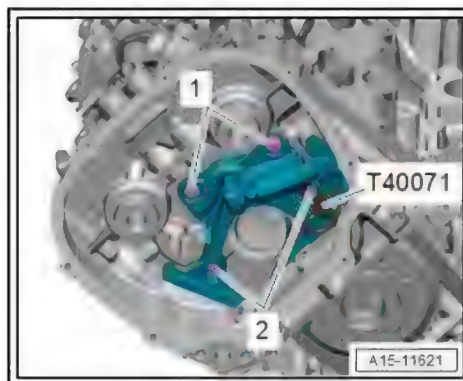


- Remove bolts -1, 2- and take chain tensioner off cylinder head.

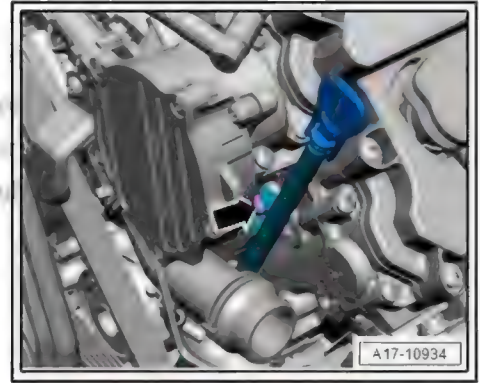


**Note**

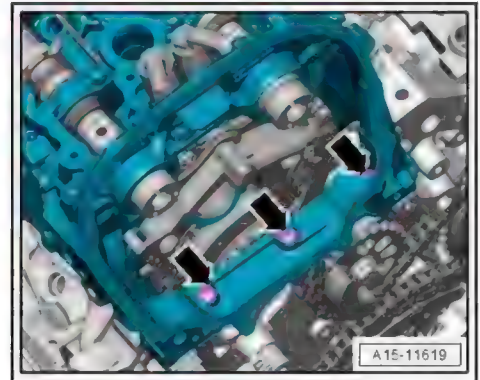
*Locking pin - T40071- remains in place.*



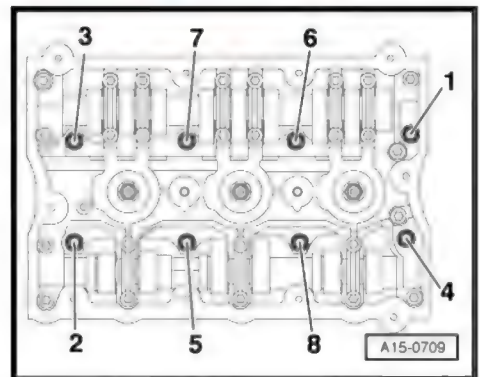
- Move electrical wiring clear.
- Remove bolt -arrow- and pull out guide tube for oil dipstick.



- Remove bolts -arrows- at rear of cylinder head.



- Slacken cylinder head bolts in the sequence -1 ... 8-.
- Remove bolts, detach cylinder head and unplug electrical connector for injector for cylinder 4.
- Place cylinder head onto soft surface (foam plastic).



### 3.2.3 Installing cylinder head

#### Procedure



#### Caution

*Risk of damage to sealing surfaces.*

- ◆ *Carefully remove sealant residue from cylinder head and cylinder block.*
- ◆ *Ensure that no long scores or scratches are made on the surfaces.*

*Risk of damage to cylinder block.*

- ◆ *No oil or coolant must be allowed to remain in the blind holes for the cylinder head bolts in the cylinder block.*

*Risk of leaks at cylinder head gasket.*

- ◆ *Carefully remove any sealant residue from the cylinder head and cylinder block. Ensure that no long scores or scratches are made on the surfaces.*
- ◆ *Carefully remove any remaining emery and abrasive material.*
- ◆ *Do not remove new cylinder head gasket from packaging until it is ready to be fitted.*
- ◆ *Handle the cylinder head gasket very carefully to prevent damage to the silicone coating or the indented area of the gasket.*

*Risk of damage to open valves.*

- ◆ *When installing an exchange cylinder head, the plastic protectors fitted to protect the open valves should not be removed until the cylinder head is ready to be fitted.*

*Risk of damage to valves and piston crowns after working on valve gear.*

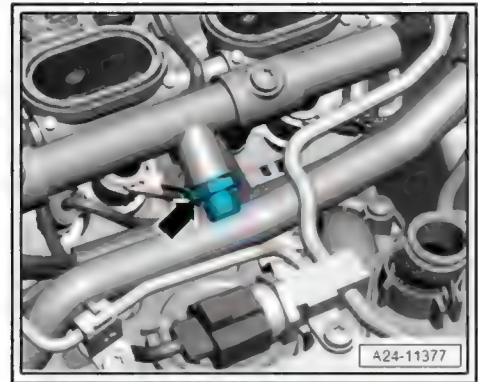
- ◆ *Turn the engine carefully at least 2 rotations to ensure that none of the valves make contact when the starter is operated.*



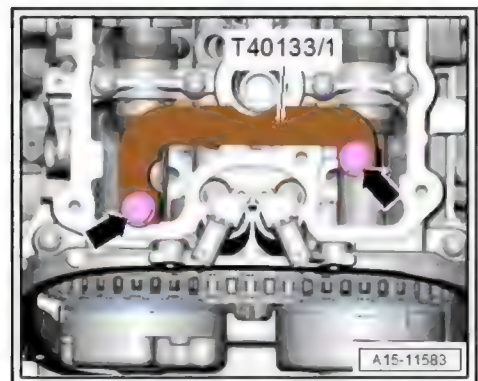
#### Note

- ◆ *Renew bolts tightened with specified tightening angle.*
- ◆ *Renew self-locking nuts, seals, gaskets and O-rings after removal.*
- ◆ *Note the different sealants for sealing surfaces and cylinder head bolts → Electronic parts catalogue .*
- ◆ *When installing an exchange cylinder head, the contact surfaces between the hydraulic compensation elements, roller rocker fingers and cams must be oiled before installing the cylinder head cover.*
- ◆ *After renewing the cylinder head or cylinder head gasket, change the coolant and engine oil.*

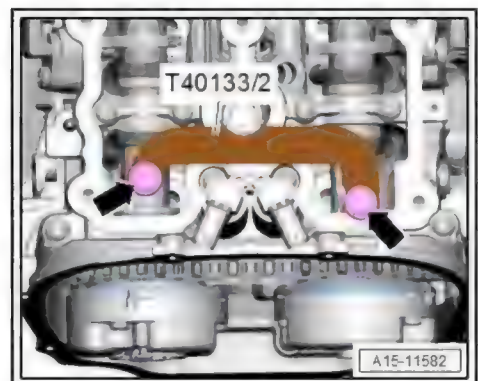
- If connection -arrow- has been unfastened or unbolted, it must be renewed.



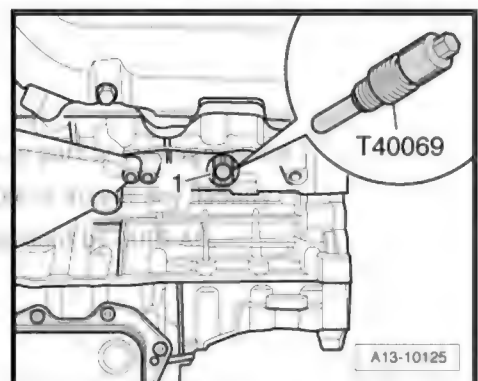
- Camshafts on cylinder head (right-side) locked in "TDC" position -arrows- with camshaft clamp - T40133/1- (25 Nm)
- The camshaft clamp - T40133/1- is positioned correctly if the holes for the cylinder head bolts remain free.



- Camshafts on cylinder head (left-side) locked in "TDC" position -arrows- with camshaft clamp - T40133/2- (25 Nm)
- The camshaft clamp - T40133/2- is positioned correctly if the holes for the cylinder head bolts remain free.



- Crankshaft -1- locked in "TDC" position with locking pin - T40069-



Entered by copyright. Copying for professional purposes is permitted only with the permission of AUDI AG. AUDI AG does not guarantee the correctness of the information in this document. For

- Fit new seals for coolant pipe (front).
- Place cylinder head gasket in position.
- Installation position: the word "oben" (top) or the Part No. should be visible.
- Pay attention to dowel sleeves -arrows- in cylinder block.
- Fit cylinder head.
- Tighten cylinder head bolts  
⇒ [Fig. "Cylinder head - tightening torque and sequence", page 116](#).
- Tighten bolts -arrows-.



#### Note

*Cylinder head bolts do not have to be torqued down again later after repair work.*

Remaining installation steps are carried out in reverse sequence; note the following:

- Install camshafts  
⇒ ["4.4 Removing and installing camshaft", page 134](#).
- Install coolant pipe (front left)  
⇒ ["3.2.1 Removing and installing coolant pipe \(front left\)", page 208](#).
- Install fuel line for MPI injection system  
⇒ ["4.5 Removing and installing fuel line", page 303](#).
- Install coolant pipe (top)  
⇒ ["3.2.5 Removing and installing coolant pipe \(top\)", page 216](#).
- Install coolant pipe (front right)  
⇒ ["3.2.3 Removing and installing coolant pipe \(front right\)", page 211](#).
- Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Change engine oil ⇒ Maintenance ; Booklet 411.
- Fill cooling system with fresh coolant  
⇒ ["1.3 Draining and filling cooling system", page 183](#).

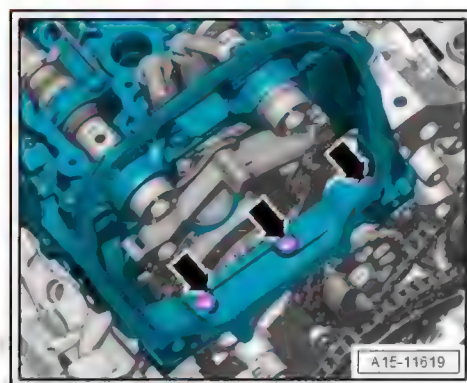
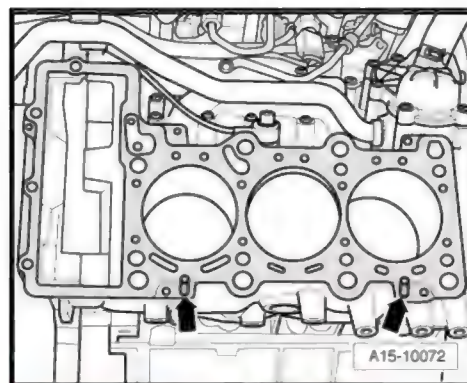
#### Tightening torques

- ◆ ⇒ [Fig. "Cylinder head - tightening torque and sequence", page 116](#)
- ◆ ⇒ [Fig. "Guide tube for oil dipstick - tightening torque", page 158](#)
- ◆ ⇒ [Item 19 \(page 206\)](#)

### 3.3 Removing and installing cylinder head cover

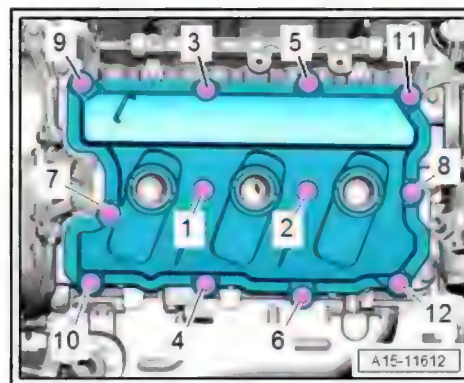
#### Removing

- Remove ignition coils  
⇒ ["1.3 Removing and installing ignition coils with output stages", page 376](#).



#### Cylinder bank 1 (right-side):

- Move fuel hose clear at cylinder head cover.
- Unscrew bolts in the sequence -12 ... 1- and remove cylinder head cover.



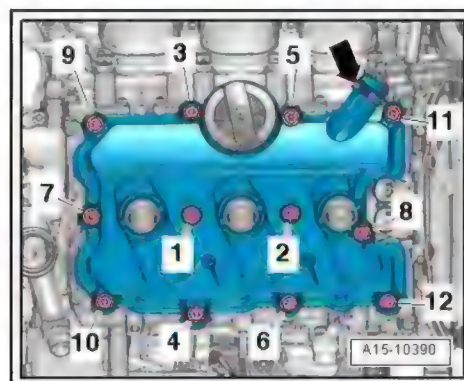
#### Cylinder bank 2 (left-side):



#### Note

*The crankcase breather hose -arrow- cannot be disconnected from the cylinder head cover without being damaged irreparably.*

- Remove bolts in the sequence -12 ... 1-.
- Move cylinder head cover to one side with crankcase breather hose -arrow- connected.



*Illustrated by program. Supplying large-scale commercial programs to third parties without  
 permission is prohibited by AUDI AG. AUDI AG does not assume any liability  
 with respect to the correctness of information in this document. Copyrighted Audi AG.*

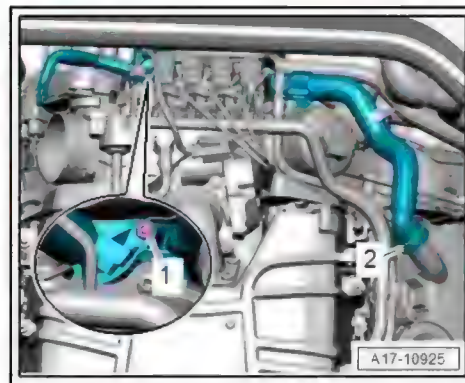
If cylinder head cover is being removed:

- Remove throttle valve module - J338-  
⇒ ["4.3 Removing and installing throttle valve module J338"](#),  
[page 301](#) .
- Remove bolt -1-, detach connection with crankcase breather  
hose and move clear.
- Detach cylinder head cover.



Note

Disregard -item 2-.



Installing

Installation is carried out in reverse order; note the following:



Note

- ◆ *Renew O-ring after removal.*
- ◆ *Renew gasket for cylinder head cover if damaged.*
- ◆ *Renew cylinder head cover bolts if gasket is damaged.*
- Clean surfaces; they must be free of oil and grease.
- Install throttle valve module - J338-  
⇒ ["4.3 Removing and installing throttle valve module J338"](#),  
[page 301](#) .
- Install ignition coils  
⇒ ["1.3 Removing and installing ignition coils with output  
stages"](#), [page 376](#) .

Tightening torques

- ◆ ⇒ [Fig. "Cylinder head cover \(left-side\) - tightening torque and  
sequence"](#), [page 116](#)
- ◆ ⇒ [Fig. "Cylinder head cover \(right-side\) - tightening torque  
and sequence"](#), [page 116](#)

### 3.4 Checking compression

Special tools and workshop equipment required

- ◆ Spark plug spanner - 3122B-



◆ Compression tester - V.A.G 1763-



Procedure

- Engine oil temperature at least 30 °C
- Battery voltage at least 12.5 V
- Remove ignition coils  
 ⇒ ["1.3 Removing and installing ignition coils with output stages", page 376](#) .

- Unplug electrical connectors -4, 5- for injectors at rear of cylinder head (left and right).



Note

Disregard -items 1, 2, 3-.

- Unscrew spark plugs using spark plug socket - 3122B- .
- Check compression pressure with compression tester - V.A.G 1763- .



Note

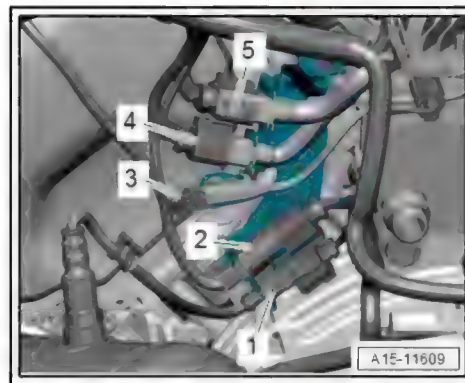
Using the compression tester ⇒ Operating instructions .

- Have a 2nd mechanic press down the accelerator pedal completely and at the same time operate the starter until the pressure on the tester display no longer increases.
- Repeat procedure on each cylinder.

Compression pressure	bar
When new	11.0 ... 14.0
Wear limit	10.0
Maximum difference between cylinders	3.0

Assembly is carried out in reverse sequence; note the following:

- Install spark plugs ⇒ Maintenance ; Booklet 411 .
- Install ignition coils  
⇒ ["1.3 Removing and installing ignition coils with output stages", page 376 .](#)
- Erase any entries in event memory resulting from testing:
  - Vehicle diagnostic tester must be connected.
  - Selecting operating mode.
  - Using **[Go To]** button and "Function/component selection" function, select the following in succession from tree:
    - ◆ Drive train
    - ◆ 01 - Self-diagnosis compatible systems
    - ◆ Simos injection and ignition system
    - ◆ Functions
    - ◆ Readiness code



## 4 Valve gear

⇒ ["4.1 Exploded view - valve gear", page 129](#)

⇒ ["4.2 Measuring axial clearance of camshaft", page 132](#)

⇒ ["4.3 Measuring radial clearance of camshaft", page 133](#)

⇒ ["4.4 Removing and installing camshaft", page 134](#)

⇒ ["4.5 Removing and installing camshaft control valves",  
page 141](#)

⇒ ["4.6 Checking hydraulic compensation elements", page 142](#)

⇒ ["4.7 Removing and installing valve stem oil seals", page 144](#)

### 4.1 Exploded view - valve gear



#### Note

- ◆ *Cylinder heads which have cracks between the valve seats or between a valve seat insert and the spark plug thread can be re-installed without reducing service life, provided the cracks are only slight and do not exceed a maximum of 0.3 mm in width, and no more than the first 4 turns of the spark plug threads are cracked.*
- ◆ *Illustration shows the cylinder head for cylinder bank 2 (left-side) as an example.*



Protected by copyright. Copying for private or commercial purposes is prohibited in whole or in part without permission by AUDI AG. AUDI AG assumes no liability for loss of any liability. All rights reserved. (To the extent of the law, no liability is assumed). Copyright by AUDI AG.

# 1 - Exhaust valve

- ☐ Must not be machined; only grinding-in is permissible
- ☐ Mark installation position for re-installation
- ☐ Checking  
⇒ ["5.2 Checking valves", page 154](#)
- ☐ Valve dimensions  
⇒ ["5.3 Valve dimensions", page 154](#)
- ☐ Checking valve guides  
⇒ ["5.1 Checking valve guides", page 153](#)

# 2 - Sealing plug

- ☐ Apply sealant when installing; refer to ⇒ Electronic parts catalogue

# 3 - Cylinder head

- ☐ Checking valve guides  
⇒ ["5.1 Checking valve guides", page 153](#)

# 4 - Valve stem oil seal

- ☐ Removing and installing  
⇒ ["4.7 Removing and installing valve stem oil seals", page 144](#)

# 5 - Valve spring

- ☐ Installation position  
⇒ [Fig. "Installation position of valve spring", page 132](#)

# 6 - Valve spring plate

# 7 - Valve cotters

# 8 - Hydraulic compensation element

- ☐ Clipped into roller rocker finger -item 8-
- ☐ Checking ⇒ ["4.6 Checking hydraulic compensation elements", page 142](#)
- ☐ Mark installation position for re-installation
- ☐ Lubricate contact surface before installing

# 9 - Securing clip

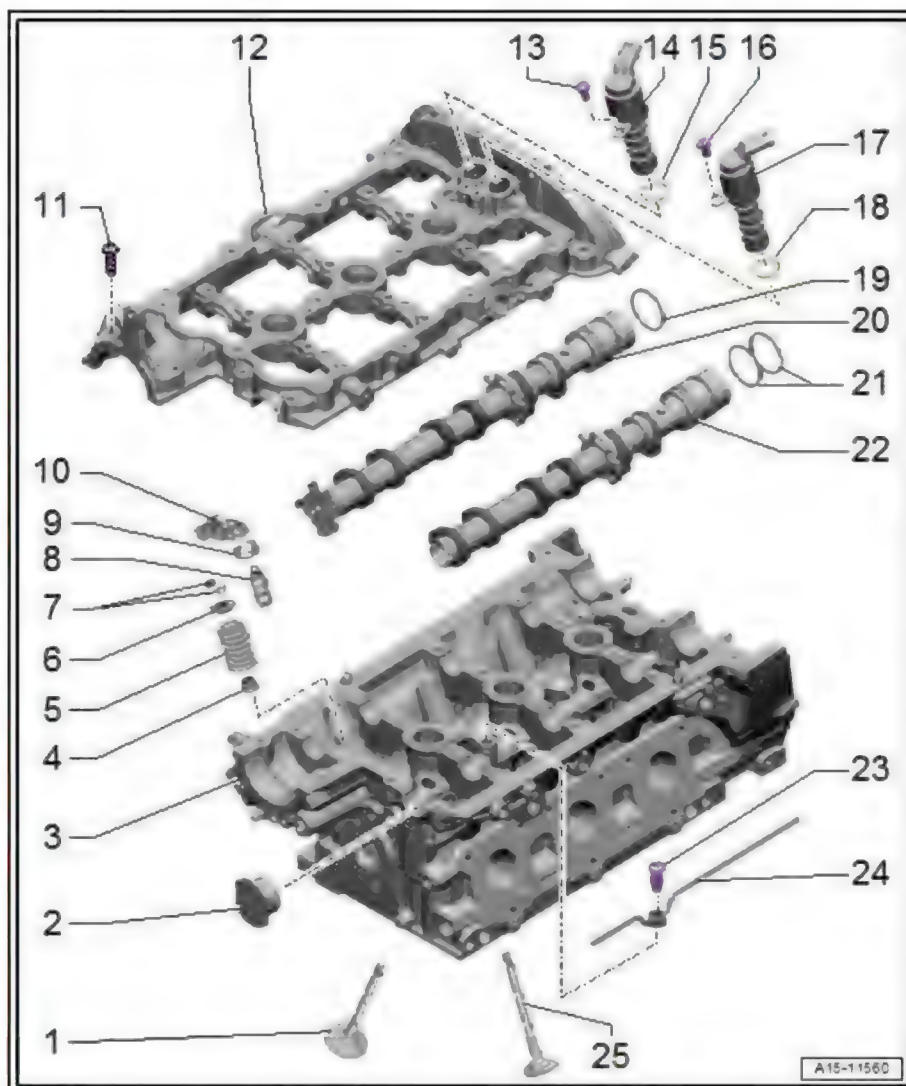
- ☐ Not supplied separately
- ☐ Check for firm attachment

# 10 - Roller rocker finger

- ☐ Mark installation position for re-installation
- ☐ Check roller bearings for ease of movement
- ☐ Lubricate contact surface before installing
- ☐ Assembly: attach to hydraulic compensation element -item 5- using securing clip -item 9-

# 11 - Bolt

- ☐ Renew after removing
- ☐ Tightening torque and sequence  
⇒ [Fig. "Retaining frame for camshafts of cylinder head, bank 2 \(left-side\) - tightening torque and sequence", page 132](#)



12 - Retaining frame

- ☐ With integrated camshaft bearings
- ☐ Removing and installing ⇒ ["4.4 Removing and installing camshaft", page 134](#)

13 - Bolt

- ☐ 5 Nm

14 - Camshaft control valve 2 - N208-

- ☐ Cylinder bank 1 (right-side): camshaft control valve 1 - N205-
- ☐ Removing and installing ⇒ ["4.5 Removing and installing camshaft control valves", page 141](#)

15 - O-ring

- ☐ Renew after removing

16 - Bolt

- ☐ 5 Nm

17 - Exhaust camshaft control valve 2 - N319-

- ☐ Cylinder bank 1 (right-side): exhaust camshaft control valve 1 - N318-
- ☐ Removing and installing ⇒ ["4.5 Removing and installing camshaft control valves", page 141](#)

18 - O-ring

- ☐ Renew after removing

19 - Compression ring

20 - Inlet camshaft

- ☐ Removing and installing ⇒ ["4.4 Removing and installing camshaft", page 134](#)
- ☐ Measuring axial clearance ⇒ ["4.2 Measuring axial clearance of camshaft", page 132](#)
- ☐ Measuring radial clearance ⇒ ["4.3 Measuring radial clearance of camshaft", page 133](#)
- ☐ Runout: max. 0.04 mm

21 - Rectangular section seals

- ☐ One or two installed (depending on version); for allocation refer to ⇒ Electronic parts catalogue

22 - Exhaust camshaft

- ☐ Removing and installing ⇒ ["4.4 Removing and installing camshaft", page 134](#)
- ☐ Measuring axial clearance ⇒ ["4.2 Measuring axial clearance of camshaft", page 132](#)
- ☐ Measuring radial clearance ⇒ ["4.3 Measuring radial clearance of camshaft", page 133](#)
- ☐ Runout: max. 0.04 mm

23 - Banjo bolt

- ☐ With valve
- ☐ 25 Nm

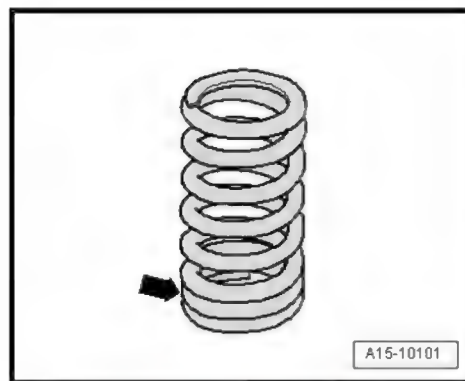
24 - Oil pipe

25 - Inlet valve

- ☐ Must not be machined; only grinding-in is permissible
- ☐ Mark installation position for re-installation
- ☐ Checking ⇒ ["5.2 Checking valves", page 154](#)
- ☐ Valve dimensions ⇒ ["5.3 Valve dimensions", page 154](#)
- ☐ Checking valve guides ⇒ ["5.1 Checking valve guides", page 153](#)

### Installation position of valve spring

- Closely spaced spring coils -arrow- face towards cylinder head.



### Retaining frame for camshafts of cylinder head, bank 1 (right-side) - tightening torque and sequence

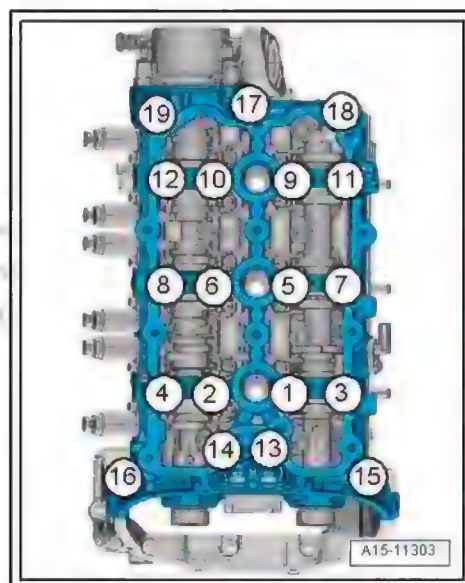


Note

Renew bolts tightened with specified tightening angle.

- Tighten bolts in stages in the sequence shown:

Stage	Bolts	Tightening torque/angle specification
1.	-1 ... 19-	Screw in by hand until contact is made <ul style="list-style-type: none"> <li>The retaining frame should make contact with the cylinder head over the full surface</li> </ul>
2.	-1 ... 19-	8 Nm
3.	-1 ... 19-	Turn 90° further



### Retaining frame for camshafts of cylinder head, bank 2 (left-side) - tightening torque and sequence

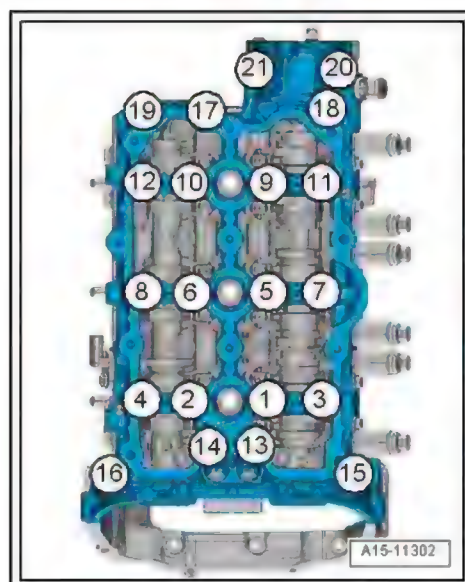


Note

Renew bolts tightened with specified tightening angle.

- Tighten bolts in stages in the sequence shown:

Stage	Bolts	Tightening torque/angle specification
1.	-1 ... 21-	Screw in by hand until contact is made <ul style="list-style-type: none"> <li>The retaining frame should make contact with the cylinder head over the full surface</li> </ul>
2.	-1 ... 21-	8 Nm
3.	-1 ... 21-	Turn 90° further



## 4.2 Measuring axial clearance of camshaft

Special tools and workshop equipment required

◆ Universal dial gauge bracket - VW 387-

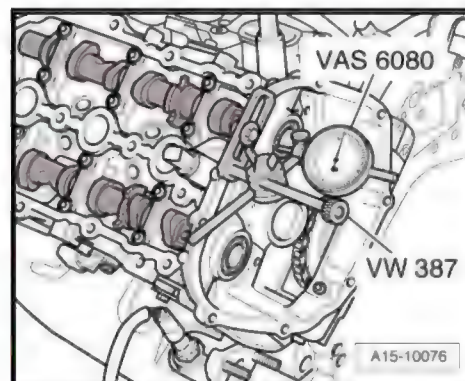


◆ Dial gauge - VAS 6080-



Procedure

- Remove camshafts  
 ⇒ ["4.4 Removing and installing camshaft", page 134](#) .
- Mark allocation of roller rocker fingers for re-installation.
- Carefully remove roller rocker fingers and place them on a clean surface.
- Re-insert camshafts, install retaining frame  
 ⇒ [Fig. "Retaining frame for camshafts of cylinder head, bank 1 \(right-side\) - tightening torque and sequence", page 132](#) or  
 ⇒ [Fig. "Retaining frame for camshafts of cylinder head, bank 2 \(left-side\) - tightening torque and sequence", page 132](#) and  
 tighten with old bolts to 8 Nm (do not turn further).
- Secure universal dial gauge bracket - VW 387- with dial gauge - VAS 6079- to cylinder head as shown in illustration.
- Press camshaft against dial gauge by hand.
- Set dial gauge to "0".
- Press camshaft away from dial gauge and read off value:
- Axial clearance: 0.100 ... 0.191 mm



## 4.3 Measuring radial clearance of camshaft

Special tools and workshop equipment required

◆ Plastigauge

Procedure



Note

*Use old bolts when measuring radial clearance.*

- Remove camshafts  
⇒ ["4.4 Removing and installing camshaft", page 134](#) .
- Mark allocation of roller rocker fingers for re-installation.
- Carefully remove roller rocker fingers and place them on a clean surface.
- Clean bearings and bearing journals.
- Place a length of Plastigauge corresponding to the width of the bearing on the bearing journal or bearing shell to be measured.
- The Plastigauge must be positioned in the centre of the bearing.
- Re-insert camshafts, fit retaining frame and secure with old bolts without rotating camshafts  
⇒ [Fig. "Retaining frame for camshafts of cylinder head, bank 1 \(right-side\) - tightening torque and sequence", page 132](#) or  
⇒ [Fig. "Retaining frame for camshafts of cylinder head, bank 2 \(left-side\) - tightening torque and sequence", page 132](#) .
- Remove retaining frame and camshafts again.
- Compare width of Plastigauge with measurement scale.

Radial clearance:

- 24 mm bearing  $\varnothing$ : 0.024 ... 0.066 mm
- 36 mm bearing  $\varnothing$ : 0.032 ... 0.078 mm
- When carrying out final assembly, renew bolts.

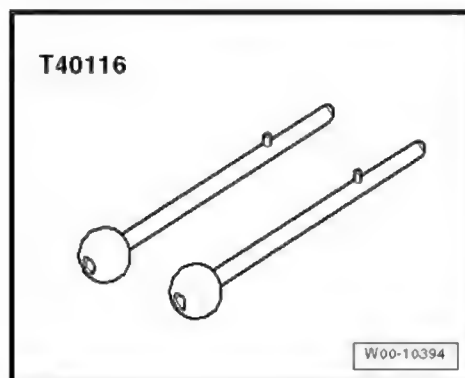
## 4.4 Removing and installing camshaft

Special tools and workshop equipment required

- ◆ Impact extractor attachment -T10133/3- from tool set for FSI engines - T10133 C-



- ◆ Locating pins - T40116-



- ◆ Electric drill with plastic brush
- ◆ Safety goggles

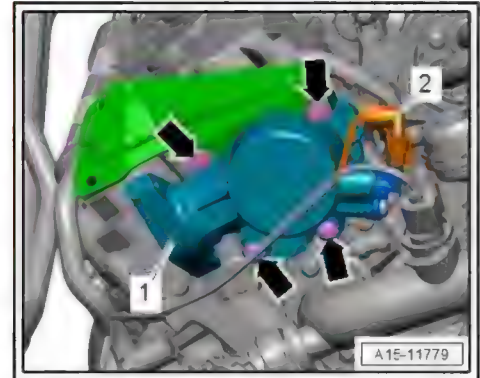
◆ Sealant ⇒ Electronic parts catalogue

Removing

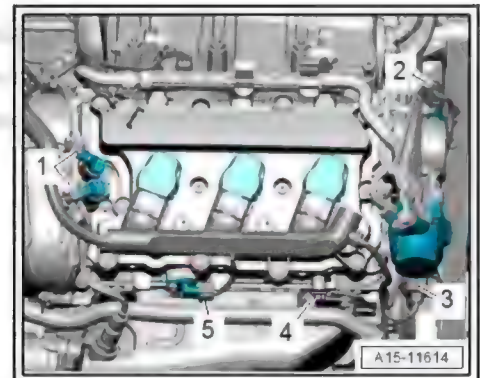
- Remove timing chain from camshafts  
 ⇒ ["2.4 Removing camshaft timing chain from camshafts", page 98](#).

Cylinder bank 1 (right-side):

- Remove high-pressure pump  
 ⇒ ["7.2 Removing and installing high-pressure pump", page 322](#).
- Unplug electrical connector -2- at Hall sender - G40-.
- Remove bolts -arrows- and detach housing -1- for high-pressure pump.



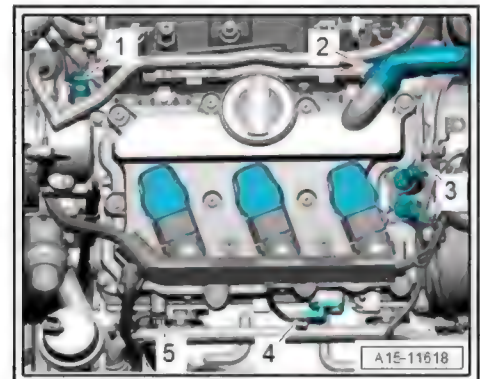
- Remove bolt -4- for earth wire.
- Unplug electrical connectors on cylinder head:  
 1 - For camshaft control valve 1 - N205- / exhaust camshaft control valve 1 - N318-  
 5 - For Hall sender 3 - G300-
- Move electrical wiring harness to one side.



*Disregard items -2 and 3-.*

Cylinder bank 2 (left-side):

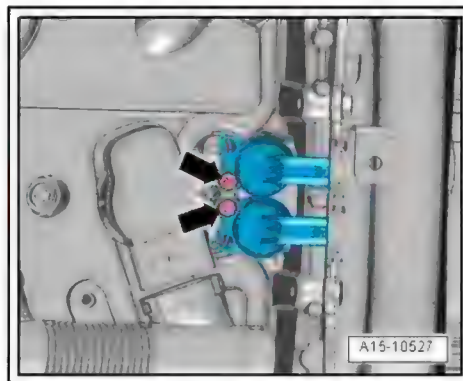
- Remove vacuum pump ⇒ Brake system; Rep. gr. 47 ; Vacuum system; Removing and installing vacuum pump.
- Remove bolt -5- for earth wire.
- Unplug electrical connectors on cylinder head:  
 1 - For Hall sender 2 - G163-  
 3 - For camshaft control valve 2 - N208- / exhaust camshaft control valve 2 - N319-  
 4 - For Hall sender 4 - G301-
- Move electrical wiring harness to one side.



*Disregard -item 2-.*

Both sides (continued):

- Remove corresponding intake manifold (bottom section)  
➔ ["4.2 Removing and installing intake manifold \(bottom section\) with fuel rail", page 297](#) .
- Remove bolts -arrows- and detach corresponding camshaft control valves.



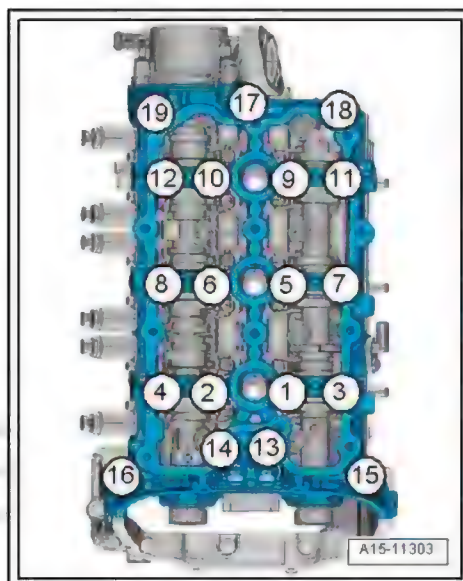
Cylinder bank 1 (right-side):



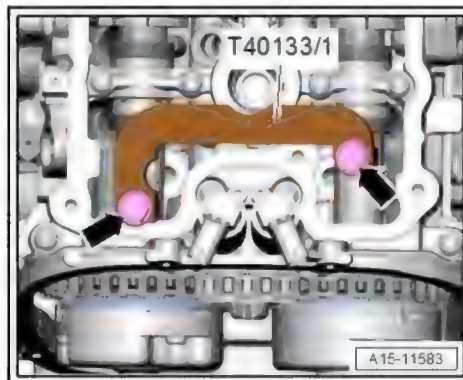
Note

*For better access, loosen high-pressure pipe at fuel rail and bracket (leave high-pressure pipe in installation position).*

- Slacken retaining frame bolts in the sequence -19 ... 1-.
- Remove bolts, carefully release retaining frame from bonded joint and set it down with camshafts on a soft surface on workbench.

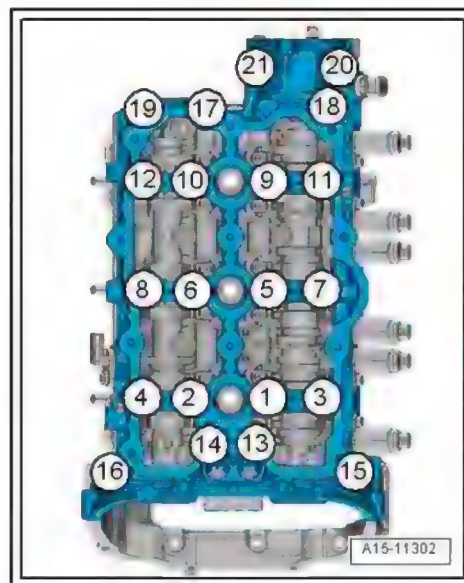


- Remove camshaft clamp - T40133/1 - -arrows-.
- Mark camshafts, remove and place on a clean surface.



#### Cylinder bank 2 (left-side):

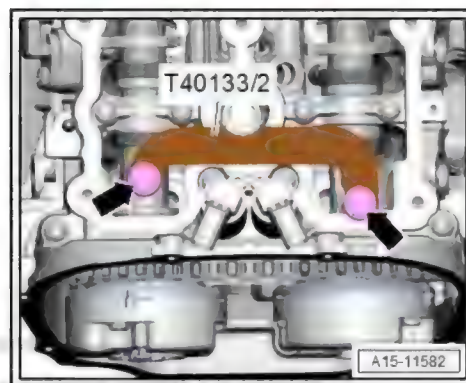
- Slacken retaining frame bolts in the sequence -21 ... 1-.
- Remove bolts, carefully release retaining frame from bonded joint and set it down with camshafts on a soft surface on work-bench.



- Remove camshaft clamp - T40133/2- -arrows-.



Unrestricted by copyright. Copyright for non-commercial use is permitted unless indicated by Audi AG. Audi AG does not guarantee the correctness of information in this document.



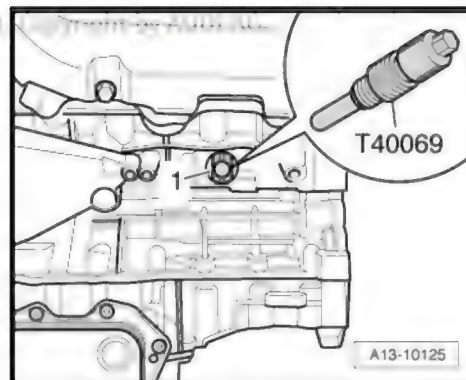
#### Installing



#### Note

*Renew seals and sealing plugs after removing.*

- Crankshaft -1- locked in "TDC" position with locking pin - T40069- .
- Hydraulic compensation elements and roller rocker fingers installed.





### Caution

Protect lubrication system and bearings against contamination.

- ◆ Cover exposed parts of the engine.

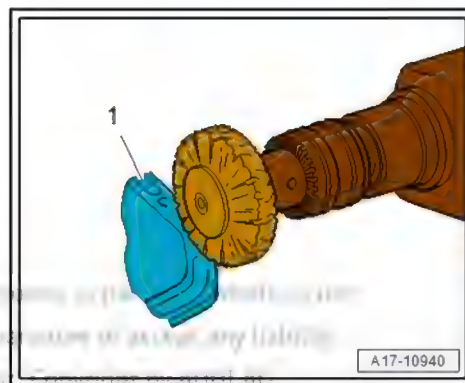


Protected by copyright. Copying for private or commercial purposes without permission is prohibited. All rights reserved by AUDI AG. AUDI AG does not assume any liability for the correctness of the information in this document. Copyright © 2018 Audi AG.

### WARNING

Risk of eye injury.

- ◆ Put on safety goggles.



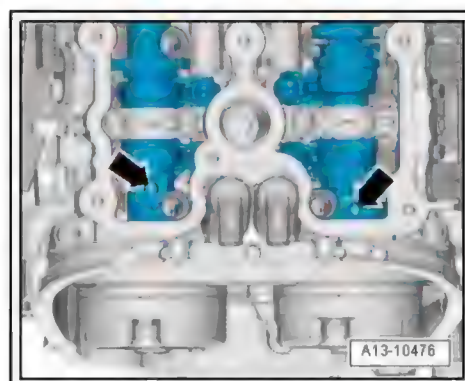
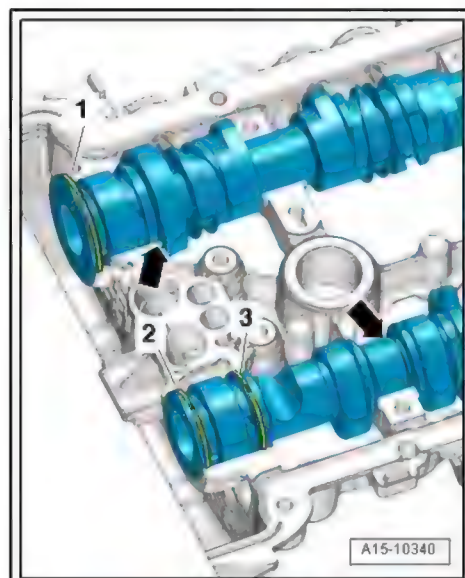
- Remove remaining sealant from cylinder head and retaining frame -1- using rotating plastic brush or similar.
- Clean surfaces; they must be free of oil and grease.
- Oil running surfaces of both camshafts.
- Fit camshafts in retaining frame.
- Camshafts must be in correct position in axial bearings -arrows- in retaining frame.
- The ends of the rectangular section seals -1, 2, 3- must point up or down. The ends of the rectangular section seals must never point to the side.



### Note

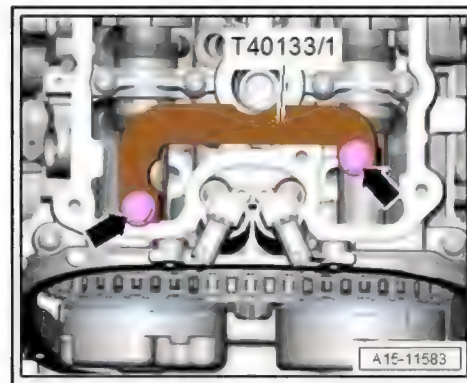
One or two rectangular section seals are installed on the exhaust camshaft -2 and/or 3- (depending on version); for allocation refer to ⇒ Electronic parts catalogue .

- Turn retaining frame over with camshafts fitted, holding camshafts firmly in position.
- Turn camshafts until threaded holes -arrows- point upwards.
- Check that camshafts are still in correct position in axial bearings in retaining frame.



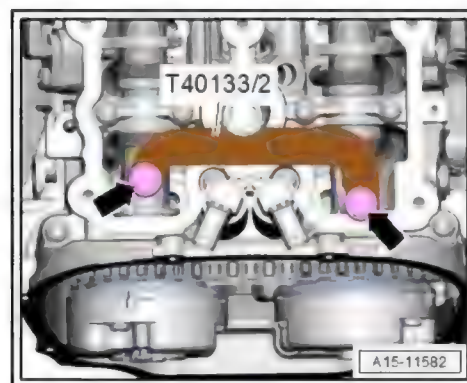
#### Cylinder bank 1 (right-side):

- Fit camshaft clamp - T40133/1- onto cylinder head -arrows- and tighten to 25 Nm.



#### Cylinder bank 2 (left-side):

- Fit camshaft clamp - T40133/2- onto cylinder head -arrows- and tighten to 25 Nm.



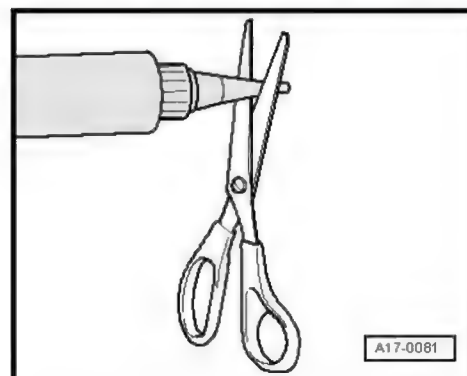
Continued for both cylinder banks:



#### Note

*Note the use-by date of the sealant.*

- Cut off nozzle of tube at front marking (nozzle Ø approx. 2 mm).



*Protected by copyright. Copying for private or commercial purposes in part or in whole is not permitted. All rights reserved by AUDI AG. AUDI AG does not guarantee or warrant any liability with respect to the correctness of information in this document. Supplied by AUDI AG*



- Turn retaining frame upside down again.



#### Caution

**Make sure excess sealant does not contaminate camshaft bearings.**

- ◆ The sealant beads must not be thicker than specified.

- Apply beads of sealant -4 ... 8- onto clean sealing surfaces of retaining frame as shown in illustration.
- Width of sealant beads: 2.0 mm.
- Apply beads of sealant -1 ... 3- onto clean sealing surfaces of retaining frame as shown in illustration.
- Width of sealant beads: 2.5 mm.



#### Note

*The retaining frame must be installed within 5 minutes after applying the sealant.*

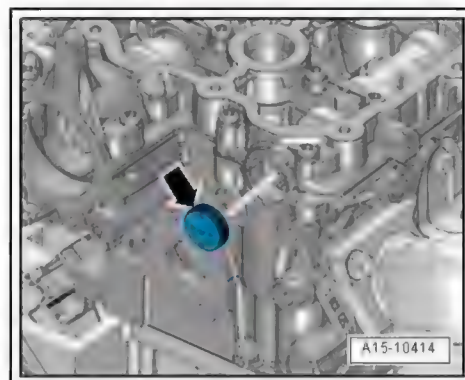
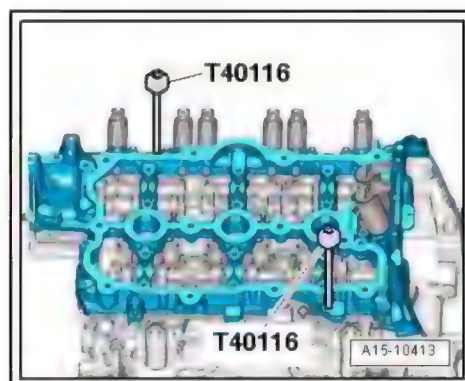
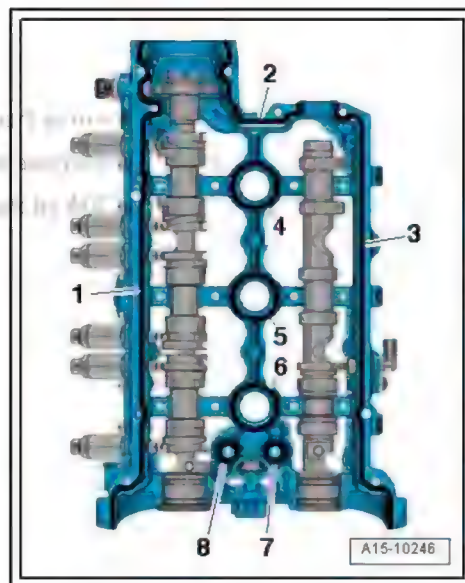
- Fit retaining frame onto cylinder head.
- Insert locating pins -T40116- in retaining frame and cylinder head.
- Tighten bolts securing retaining frame for camshafts.



#### Note

*After installing the retaining frame, wait about 30 minutes for the sealant to dry.*

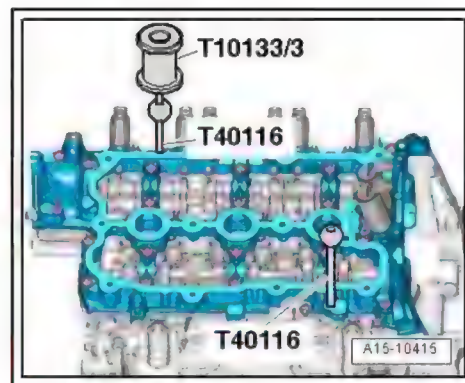
- Clean bore for outer sealing plug in cylinder head (left and right); it must be free of oil and grease.
- Coat outer circumference of sealing plug -arrow- with sealant; for sealant refer to ⇒ Electronic parts catalogue .
- Drive in sealing plug until flush.



- Use impact extractor attachment -T40116- to pull out locating pins -T10133/3- .

Remaining installation steps are carried out in reverse sequence; note the following:

- Install camshaft control valves  
⇒ ["3.1 Exploded view - cylinder head", page 115](#) .
- Install intake manifold (bottom section)  
⇒ ["4.2 Removing and installing intake manifold \(bottom section\) with fuel rail", page 297](#) .
- Install housing for high-pressure pump drive and high-pressure pump  
⇒ ["7.2 Removing and installing high-pressure pump", page 322](#) .
- Install vacuum pump ⇒ Brake system; Rep. gr. 47 ; Vacuum system; Removing and installing vacuum pump .
- Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Fit timing chains on camshafts  
⇒ ["2.5 Removing and installing camshaft timing chain", page 108](#) .



#### Caution

*Risk of damage to valves and piston crowns after working on valve gear.*

- ◆ *The hydraulic tappets have to settle; wait for approx. 30 minutes after installing camshafts before starting engine.*
- ◆ *Turn the engine carefully at least 2 rotations to ensure that none of the valves make contact when the starter is operated.*

#### Tightening torques

- ◆ ⇒ ["4.1 Exploded view - valve gear", page 129](#)
- ◆ ⇒ [Fig. 1 "Retaining frame for camshafts of cylinder head, bank 1 \(right-side\) - tightening torque and sequence", page 132](#)
- ◆ ⇒ [Fig. 2 "Retaining frame for camshafts of cylinder head, bank 2 \(left-side\) - tightening torque and sequence", page 132](#)

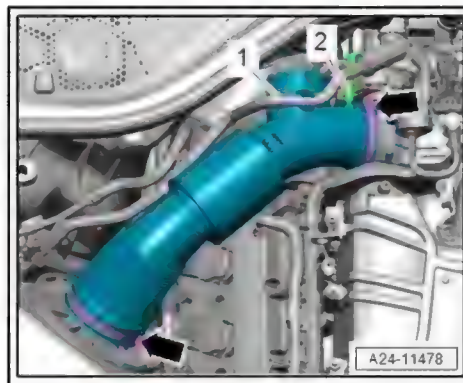
### 4.5 Removing and installing camshaft control valves

#### Removing

- Remove engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#) .

### Cylinder bank 1 (right-side):

- Move hose -1- for activated charcoal filter system clear at air pipe.
- Detach vacuum hose -2- from connection on air pipe.
- Loosen hose clips -arrows- and detach air pipe.



### Both sides (continued):

- Unplug relevant electrical connector -1-.
- Unscrew bolt -2- and detach valve.

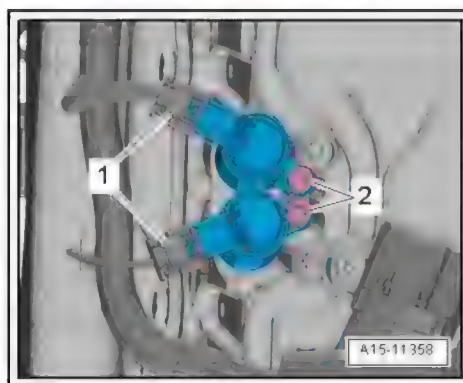
### Installing

Installation is carried out in reverse order; note the following:



#### Note

- ◆ *Renew O-rings after removing.*
- ◆ *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ [Electronic parts catalogue](#) .*
- Install engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#) .



### Tightening torques

- ◆ ⇒ ["4.1 Exploded view - valve gear", page 129](#)
- ◆ ⇒ ["2.2 Exploded view - hose connections for charge air system", page 275](#)

## 4.6 Checking hydraulic compensation elements

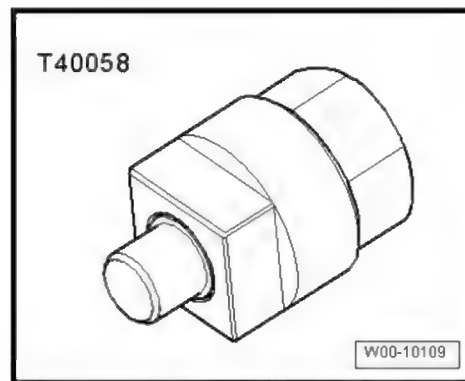


#### Note

- ◆ *The hydraulic compensation elements cannot be serviced.*
- ◆ *Irregular valve noises when starting engine are normal.*

Special tools and workshop equipment required

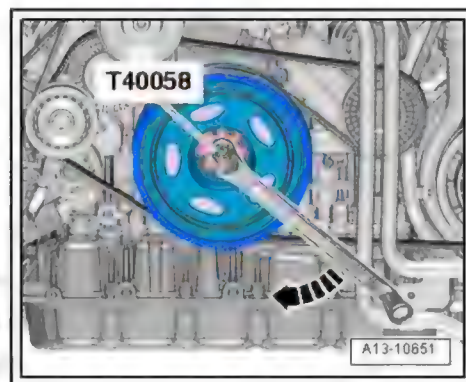
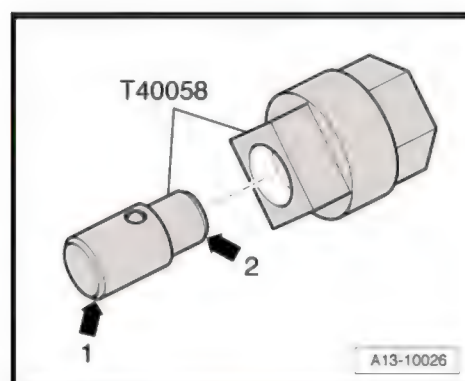
◆ Adapter - T40058-



◆ Feeler gauge

Procedure

- Start engine and run until radiator fan has started up once.
- Increase engine speed to approx. 2500 rpm for 2 minutes (perform road test if necessary).
- If the compensation elements are still noisy, locate the defective compensation element as follows:
- Remove cylinder head cover  
⇒ ["3.3 Removing and installing cylinder head cover", page 124](#).
- Insert guide pin of adapter -T40058- as follows:
  - The larger-diameter section -arrow 1- faces towards the engine.
  - The smaller-diameter section -arrow 2- faces the adapter.
- Use adapter - T40058- and angled ring spanner to turn crankshaft in direction of engine rotation -arrow-.

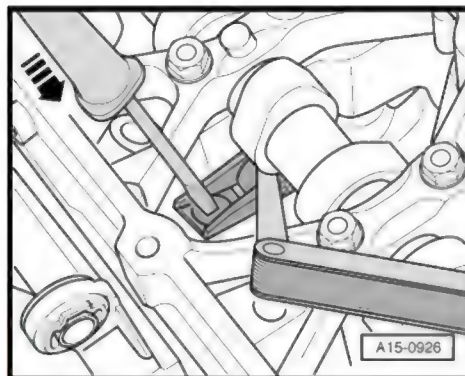


Protected by copyright. Copying for private or commercial purposes is prohibited without permission by Audi AG. Audi AG does not guarantee the correctness of the information in this document. Copy

- Press roller rocker finger down -arrow- to determine clearance between cam and roller rocker finger.
- If it is possible to insert a feeler gauge of 0.20 mm between cam and roller rocker finger, renew hydraulic compensation element  
⇒ [“4.4 Removing and installing camshaft”, page 134](#) .

Additional steps required

- Install cylinder head cover  
⇒ [“3.3 Removing and installing cylinder head cover”, page 124](#) .



## 4.7 Removing and installing valve stem oil seals

⇒ [“4.7.1 Removing and installing valve stem oil seals \(cylinder head installed\)”, page 144](#)

⇒ [“4.7.2 Removing and installing valve stem oil seals \(cylinder head removed\)”, page 148](#)

### 4.7.1 Removing and installing valve stem oil seals (cylinder head installed)

Special tools and workshop equipment required



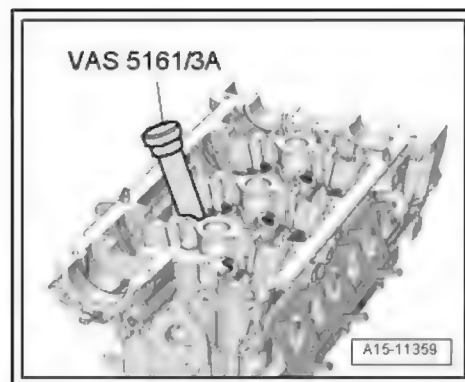
Protected by copyright. Copying for private or commercial use without permission is prohibited. All rights reserved. Audi AG does not accept any liability for damages or consequences arising from the use of this document. Copyright by Audi AG.

<p><b>3122 B</b></p>	<p><b>3364</b></p>
<p><b>3365</b></p>	<p><b>VAS 5161</b></p>
<p><b>T40012</b></p>	<p><b>G15-0058</b></p>

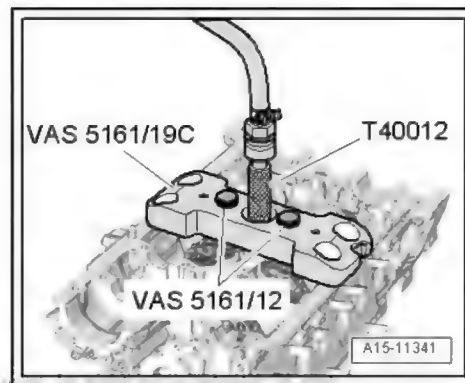
- ◆ Spark plug spanner - 3122B-
- ◆ Valve stem seal puller - 3364-
- ◆ Valve stem seal fitting tool - 3365-
- ◆ Removal and installation device for valve cotters - VAS 5161 A- with guide plate -VAS 5161/19C- , or substitute -VAS 5161/19B-
- ◆ Adapters - T40012-

#### Procedure

- Remove camshafts  
 ⇒ ["4.4 Removing and installing camshaft", page 134](#) .
- Mark original positions of roller rocker fingers and hydraulic compensation elements for re-installation.
- Remove roller rocker fingers together with hydraulic compensation elements and put down on a clean surface.
- Unscrew spark plugs using spark plug socket - 3122B- .
- Set piston of appropriate cylinder to "bottom dead centre".
- Apply drift -VAS 5161/3A- to valve spring plate and use plastic-headed hammer to release sticking valve cotters.

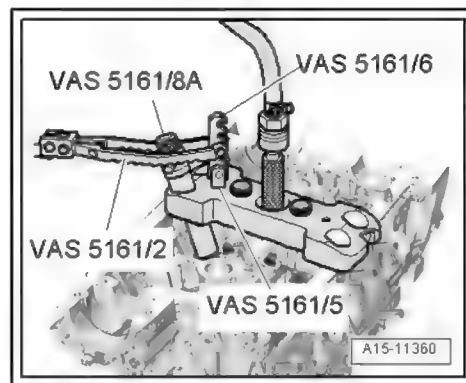


- Fit guide plate -VAS 5161/19C- from removal and installation device for valve cotters - VAS 5161 A- on cylinder head.
- Secure guide plate with knurled screws -VAS 5161/12- .
- Screw adapter - T40012/1- with seal hand-tight into the corresponding spark plug thread.
- Connect adapter to compressed air line using a commercially available connection piece and apply constant air pressure.
- Minimum pressure: 6 bar



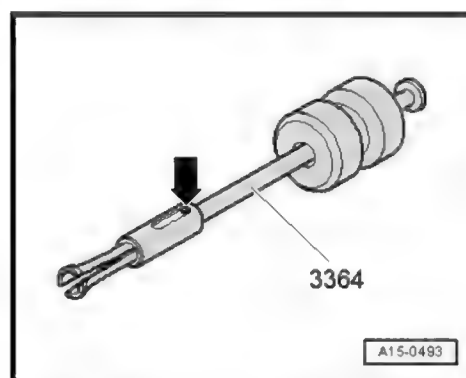
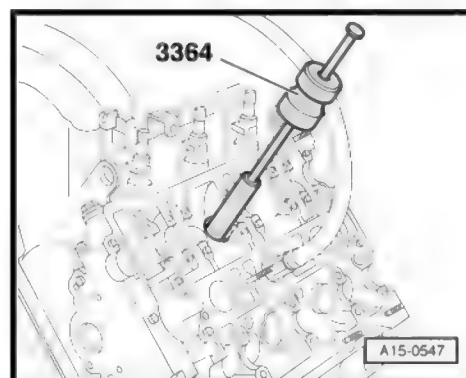
Protected by copyright. Copying (including commercial) without permission is prohibited. All rights reserved. Audi AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Screw snap-in device -VAS 5161/6- with engaging fork -VAS 5161/5- into guide plate.
- Insert assembly cartridge -VAS 5161/8A- in guide plate.
- Attach pressure fork -VAS 5161/2- to snap-in device and push assembly cartridge down.
- At the same time, turn knurled screw of assembly cartridge clockwise until tips engage in valve cotters.
- Move knurled screw back and forth slightly; the valve cotters are thus forced apart and taken up by the assembly cartridge.
- Release pressure fork.
- Take out assembly cartridge.
- Detach guide plate and turn to one side.
  - The compressed air hose remains connected.
- Detach valve spring with valve spring plate.
- Pull off valve stem oil seal with valve stem seal puller - 3364- .

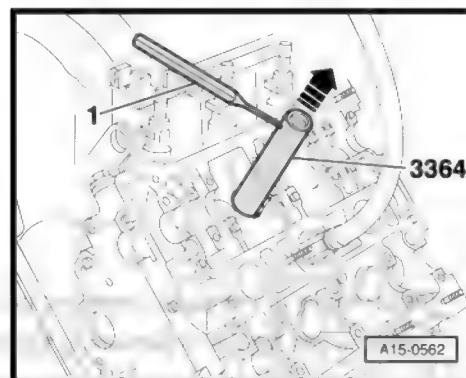


If the valve stem seal puller - 3364- cannot be used on some of the valve stem oil seals due to the confined space, proceed as follows:

- Knock out pin -arrow- of puller using a drift and remove impact extractor attachment.



- Apply bottom section of puller -3364- to valve stem oil seal.
- Secure puller with a punch or roll-pin drift -1-, as shown in illustration.
- Apply assembly lever to puller and pull out valve stem oil seal -arrow-.





#### Caution

*Make sure valve stem oil seals are not damaged when installing.*

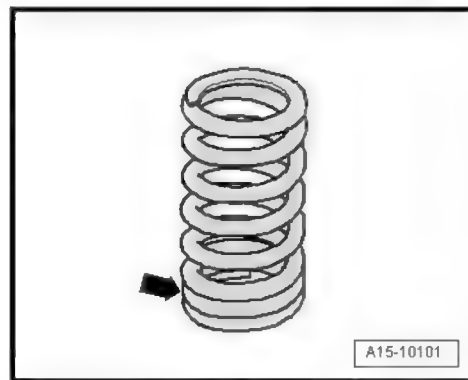
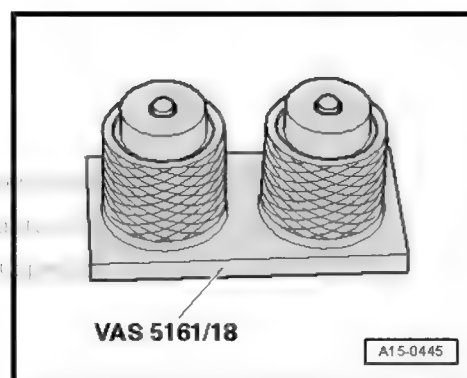
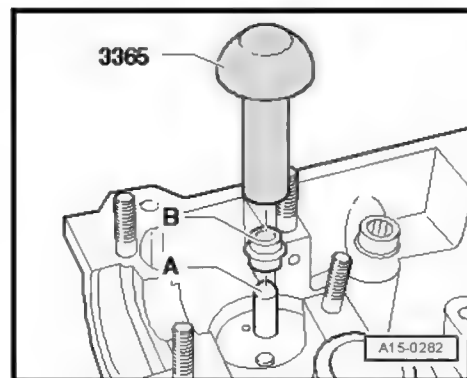
- ◆ *New valve stem oil seals -B- are supplied with plastic sleeve; fit plastic sleeve -A- onto valve stem.*

- Lightly oil sealing lip of valve stem oil seal.
- Slide valve stem oil seal onto plastic sleeve.
- Carefully press valve stem oil seal onto valve guide using valve stem seal fitting tool - 3365- .
- Remove plastic sleeve.

If valve cotter pins have been removed from assembly cartridge, they must first be inserted in insertion device -VAS 5161/18- .

- Larger diameter of valve cotter pins faces upwards.
- Press assembly cartridge onto insertion device from above and take up valve cotter pins.

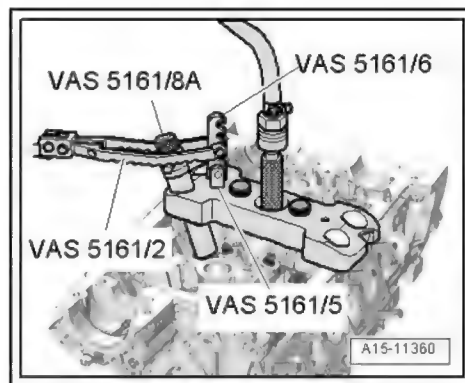
- Insert valve spring and valve spring plate.
- The closely spaced spring coils -arrow- face the cylinder head.



- Secure guide plate -VAS 5161/19C- back onto cylinder head.
- Insert assembly cartridge in guide plate.
- Press down pressure fork and pull knurled screw upwards while turning screw in both directions - this will insert the valve cotter.
- Release pressure fork with knurled screw still in pulled position.
- Repeat procedure for each valve.

#### Assembling

- Ensure that all roller rocker fingers make contact with the ends of the valve stems correctly and are clipped onto their respective hydraulic compensation elements.
- Install spark plugs ⇒ Maintenance ; Booklet 411 .
- Install camshafts  
⇒ ["4.4 Removing and installing camshaft", page 134](#) .



#### Caution

*Risk of damage to valves and piston crowns after working on valve gear.*

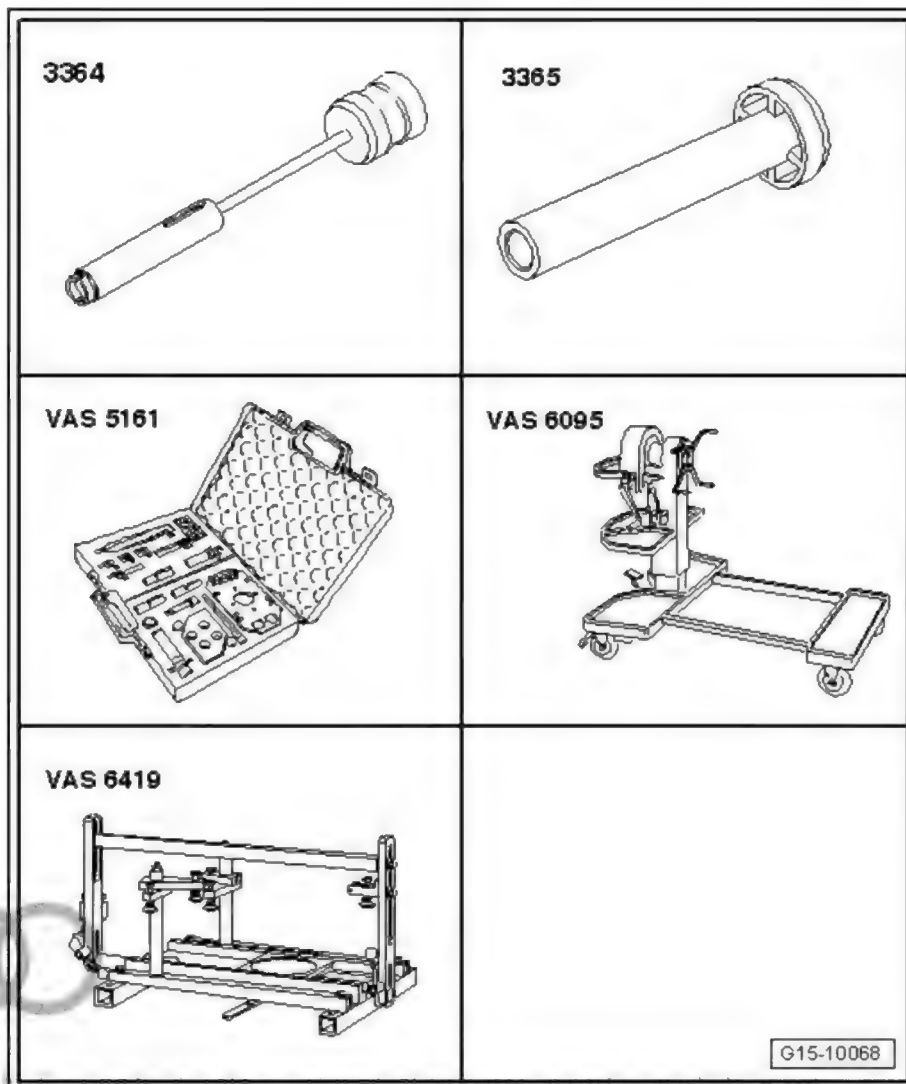
- ◆ *The hydraulic tappets have to settle; wait for approx. 30 minutes after installing camshafts before starting engine.*
- ◆ *Turn the engine carefully at least 2 rotations to ensure that none of the valves make contact when the starter is operated.*

### 4.7.2 Removing and installing valve stem oil seals (cylinder head removed)



Revised by copyright. Copyright for technical information purposes. In part or in whole, it may not be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without the prior written permission of Audi AG. Audi AG does not assume any liability with respect to the correctness of information this document. Copyright by Audi AG.

Special tools and workshop  
 equipment required

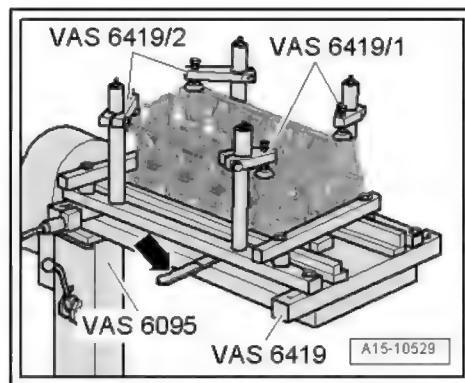


- ◆ Valve stem seal puller - 3364-
- ◆ Valve stem seal fitting tool - 3365-
- ◆ Removal and installation device for valve cotters - VAS 5161  
 A- with guide plate -VAS 5161/19C- , or substitute -VAS 5161/19B-
- ◆ Engine and gearbox support - VAS 6095-
- ◆ Cylinder head tensioning device - VAS 6419-

#### Procedure

- Remove camshafts  
 ⇒ ["4.4 Removing and installing camshaft", page 134](#) .
- Mark original positions of roller rocker fingers and hydraulic compensation elements for re-installation.
- Remove roller rocker fingers together with hydraulic compensation elements and put down on a clean surface.

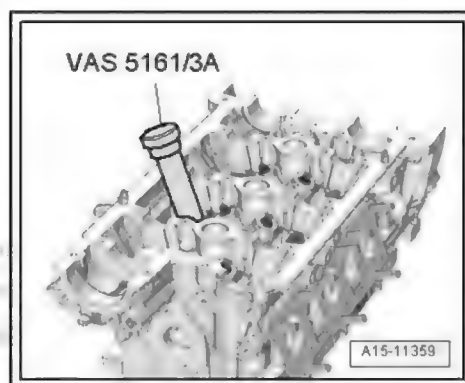
- Insert cylinder head tensoning device - VAS 6419- into engine and gearbox support - VAS 6095- .
- Secure cylinder head in cylinder head tensoning device, as shown in illustration.
- Connect cylinder head tensoning device to compressed air supply.
- Using lever -arrow-, slide air pad under combustion chamber where valve stem oil seal is to be removed.
- Apply just enough compressed air to bring air pad into contact with valve heads.



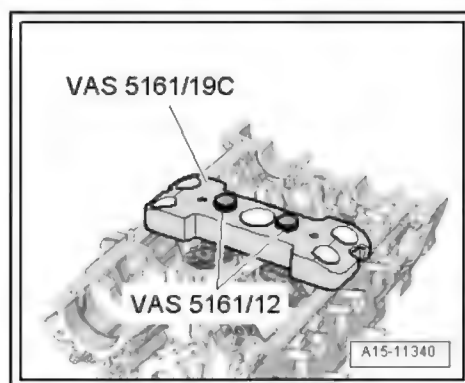
- Apply drift -VAS 5161/3A- to valve spring plate and use plastic-headed hammer to release sticking valve cotters.



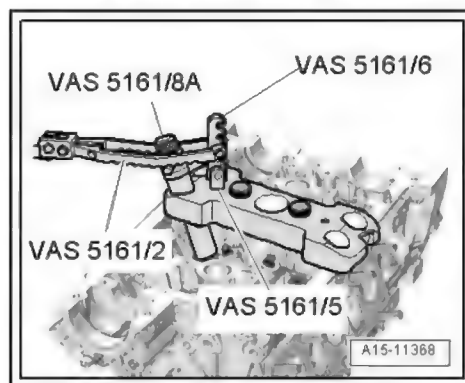
Protected by copyright. Escaping the prohibitive jurisdiction of copyright law is not permitted unless authorized by AUDI AG. AUDI AG does not guarantee the correctness of the content of this information or the document. Copyright



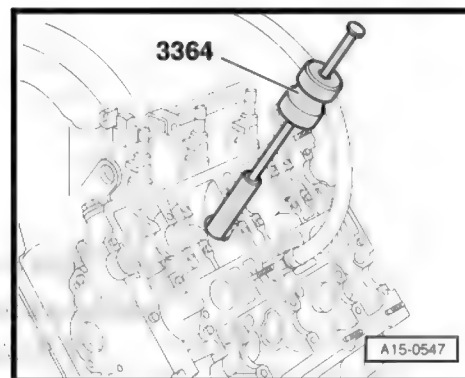
- Fit guide plate -VAS 5161/19C- onto cylinder head.
- Secure guide plate with knurled screws -VAS 5161/12- .



- Screw snap-in device -VAS 5161/6- with engaging fork - VAS 5161/5- into guide plate.
- Insert assembly cartridge -VAS 5161/8A- in guide plate.
- Attach pressure fork -VAS 5161/2- to snap-in device and push assembly cartridge down.
- At the same time, turn knurled screw of assembly cartridge clockwise until tips engage in valve cotters.
- Move knurled screw back and forth slightly; the valve cotters are thus forced apart and taken up by the assembly cartridge.
- Release pressure fork.
- Take out assembly cartridge.
- Detach guide plate and turn to one side.
- Detach valve spring with valve spring plate.



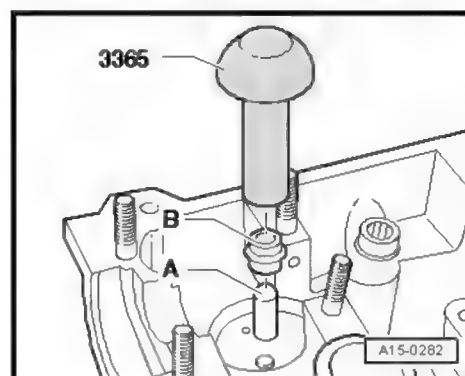
- Pull off valve stem oil seal with valve stem seal puller - 3364- .



#### Caution

*Make sure valve stem oil seals are not damaged when installing.*

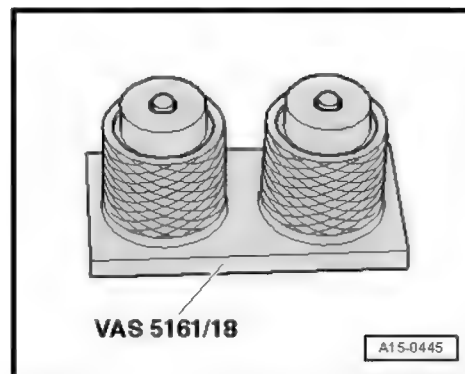
- ◆ New valve stem oil seals -B- are supplied with plastic sleeve; fit plastic sleeve -A- onto valve stem.



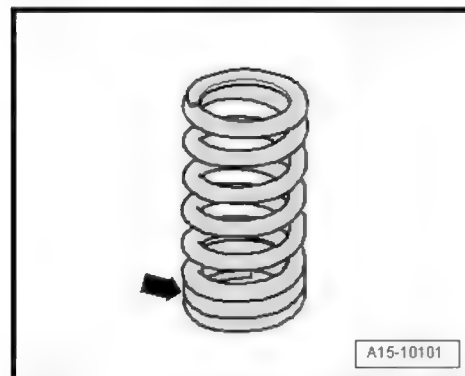
- Lightly oil sealing lip of valve stem oil seal.
- Slide valve stem oil seal onto plastic sleeve.
- Carefully press valve stem oil seal onto valve guide using valve stem seal fitting tool - 3365- .
- Remove plastic sleeve.

If valve cotters have been removed from assembly cartridge, they must first be inserted in insertion device -VAS 5161/18- .

- Larger diameter of valve cotters faces upwards.
- Press assembly cartridge onto insertion device from above and take up valve cotters.



- Insert valve spring and valve spring plate.
- The closely spaced spring coils -arrow- face the cylinder head.

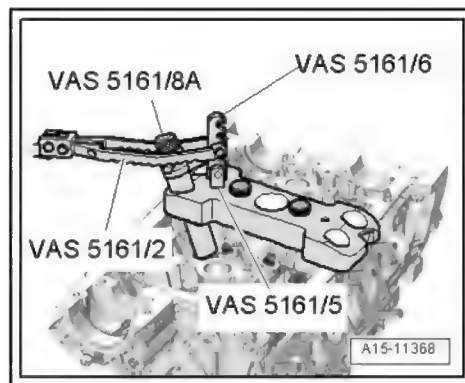


- Secure guide plate -VAS 5161/19C- back onto cylinder head.
- Insert assembly cartridge in guide plate.
- Press down pressure fork and pull knurled screw upwards while turning screw in both directions - this will insert the valve cotters.
- Release pressure fork with knurled screw still in pulled position.
- Repeat procedure for each valve.

#### Assembling

Assembly is carried out in reverse sequence; note the following:

- Ensure that all roller rocker fingers make contact with the ends of the valve stems correctly and are clipped onto their respective hydraulic compensation elements.
- Install camshafts  
⇒ ["4.4 Removing and installing camshaft", page 134](#) .



Protected by copyright. Copying for private or commercial purposes without the written, or oral, permission of Audi AG. Audi AG does not guarantee the accuracy of the information with respect to the correctness, completeness or timeliness of the information.

## 5 Inlet and exhaust valves

⇒ ["5.1 Checking valve guides", page 153](#)

⇒ ["5.2 Checking valves", page 154](#)

⇒ ["5.3 Valve dimensions", page 154](#)

### 5.1 Checking valve guides

Special tools and workshop equipment required

- ◆ Universal dial gauge bracket - VW 387-



- ◆ Dial gauge - VAS 6079-



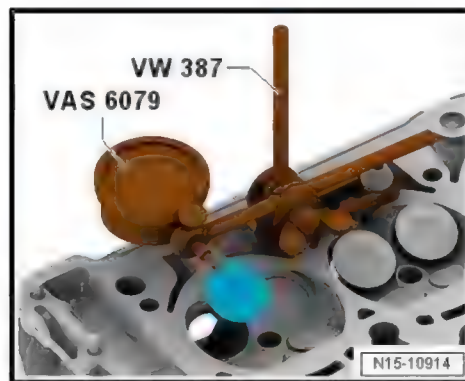
#### Procedure



#### Note

- ◆ *If the valve has to be renewed as part of a repair, use a new valve for the measurement.*
- ◆ *Only insert inlet valve into inlet valve guide and exhaust valve into exhaust valve guide, as the stem diameters are different.*

- Secure dial gauge - VAS 6079- to cylinder head with universal dial gauge bracket - VW 387- as shown in illustration.
- Insert valve into guide.
- End of valve stem must be flush with valve guide.
- Measure the amount of sideways play.
- Wear limit: 0.8 mm.
- If the wear limit is exceeded, repeat the measurement with new valves.
- Renew cylinder head if wear limit is still exceeded.



Note

Valve guides cannot be renewed.

## 5.2 Checking valves

- Visually inspect for scoring on valve stems and valve seat surfaces.
- Renew valve if scoring is clearly visible.

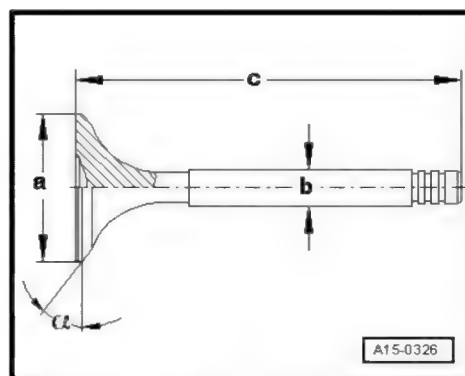
## 5.3 Valve dimensions



Note

Inlet and exhaust valves must not be machined. Only grinding-in is permitted.

Dimension		Inlet valve	Exhaust valve
Ø a	mm	$33.85 \pm 0.10$	$28.0 \pm 0.10$
Ø b	mm	$5.98 \pm 0.01$	$5.96 \pm 0.01$
c	mm	$104.00 \pm 0.20$	$101.9 \pm 0.20$
α	°	45	45



### WARNING

Care must be taken when disposing of old sodium-cooled exhaust valves - risk of injury.

- ◆ The valves must be sawn in two with a metal saw between the centre of the stem and valve head. When doing so, the valves must not come into contact with water.
- ◆ Then throw a maximum of ten valves into a bucket of water and step away immediately.
- ◆ A sudden chemical reaction will occur upon contact with water in which the sodium filling burns.
- ◆ After performing these steps the valves can be disposed of in the normal way.

## 17 – Lubrication

### 1 Sump/oil pump

⇒ [“1.1 Exploded view - sump/oil pump”, page 155](#)

⇒ [“1.2 Engine oil”, page 158](#)

⇒ [“1.3 Removing and installing sump \(bottom section\)”,  
page 158](#)

⇒ [“1.4 Removing and installing sump \(top section\)”, page 160](#)

⇒ [“1.5 Removing and installing oil pump”, page 163](#)

⇒ [“1.6 Removing and installing oil level and oil temperature send-  
er G266”, page 164](#)

#### 1.1 Exploded view - sump/oil pump



##### Note

- ◆ *If large quantities of metal shavings or abrasion are found when performing engine repairs, this may be an indication of damage to the crankshaft or conrod bearings. To prevent further damage, the following steps are required after completion of repair work: clean the oil passages carefully and renew the oil spray jets, engine oil cooler and oil filter.*
- ◆ *Oil capacities, oil specifications and viscosity grades ⇒ Maintenance tables .*
- ◆ *Oil spray jet for piston cooling ⇒ [Fig. “Oil spray jet for piston cooling”](#), page 74 .*



Protected by copyright. Copying for private non-commercial purposes is permitted without charge. It is not permitted to reproduce or to use in any way for commercial purposes. Audi AG does not accept any liability for the correctness of information in this document. Copyright by Audi AG

# 1 - Oil level and oil temperature sender - G266-

- ☐ Removing and installing  
⇒ ["1.6 Removing and installing oil level and oil temperature sender G266"](#), page 164

# 2 - Seal

- ☐ Renew after removing

# 3 - Bolt

- ☐ Renew after removing
- ☐ Tightening torque and sequence  
⇒ [Fig. "Sump \(bottom section\) - tightening torque and sequence"](#), page 157

# 4 - Sump (bottom section)

- ☐ Removing and installing  
⇒ ["1.3 Removing and installing sump \(bottom section\)"](#), page 158

# 5 - Bolt

- ☐ 9 Nm

# 6 - Baffle plate (bottom)

# 7 - Bolt

- ☐ Renew after removing
- ☐ Tightening torque and sequence  
⇒ [Fig. "Sump \(top section\) - tightening torque and sequence"](#), page 158

# 8 - Sump (top section)

- ☐ Removing and installing ⇒ ["1.4 Removing and installing sump \(top section\)"](#), page 160

# 9 - Dowel sleeve

- ☐ 2x

# 10 - Baffle plate (top)

# 11 - Bolt

- ☐ Renew after removing
- ☐ Apply locking fluid when installing; refer to ⇒ Electronic parts catalogue
- ☐ 3 Nm +90°

# 12 - Gasket

- ☐ Insert in retaining frame
- ☐ Renew after removing

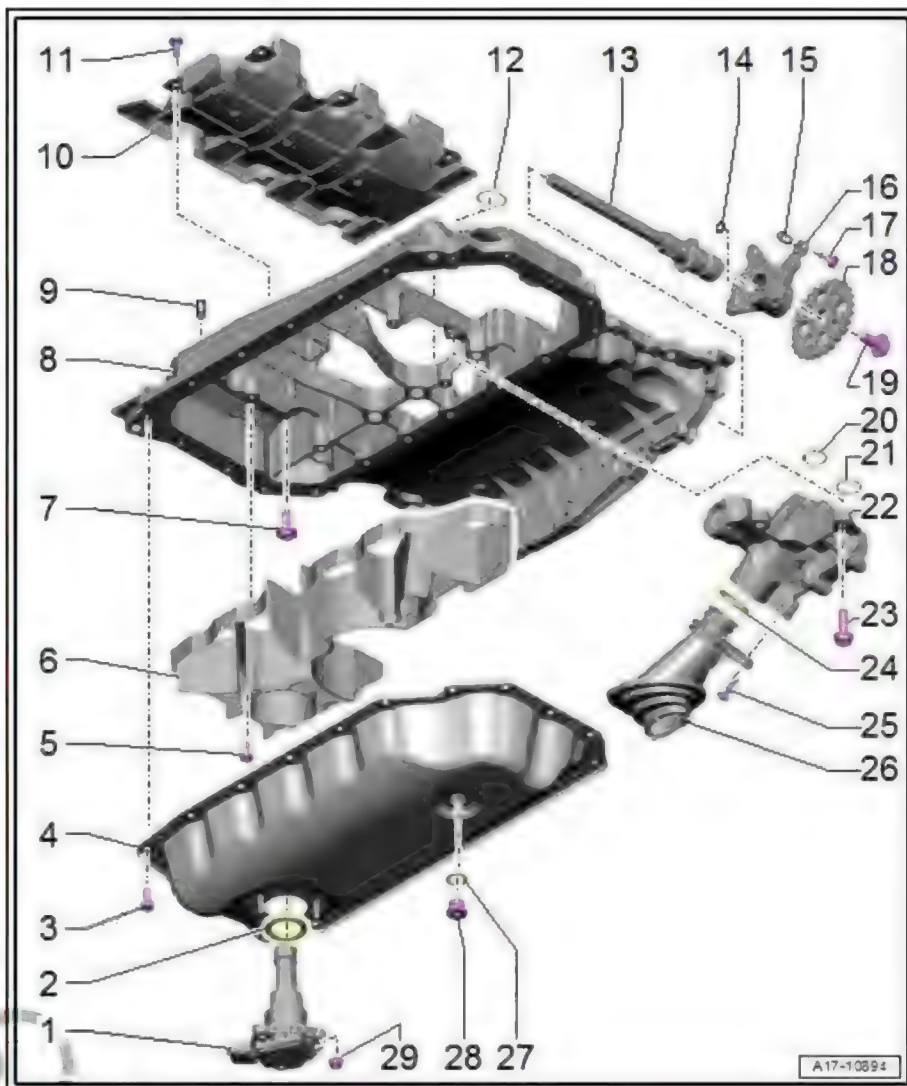
# 13 - Oil pump drive shaft

# 14 - O-ring

- ☐ Renew after removing

# 15 - Sleeve

- ☐ 2x



16 - Bearing bracket

17 - Bolt

☐ 9 Nm

18 - Chain sprocket for oil pump

☐ Can only be fitted in one position on drive shaft

19 - Bolt

☐ Renew after removing

☐ 3 Nm +90°

20 - O-ring

☐ Renew after removing

21 - Seal

☐ Renew after removing

22 - Oil pump

☐ Do not dismantle

☐ Removing and installing ⇒ ["1.5 Removing and installing oil pump", page 163](#)

23 - Bolt

☐ 20 Nm

24 - O-ring

☐ Renew after removing

25 - Bolt

☐ 9 Nm

26 - Intake connecting pipe

☐ For oil pump

27 - Seal

☐ Renew after removing

28 - Oil drain plug

☐ 30 Nm

29 - Nut

☐ 9 Nm

Sump (bottom section) - tightening torque and sequence

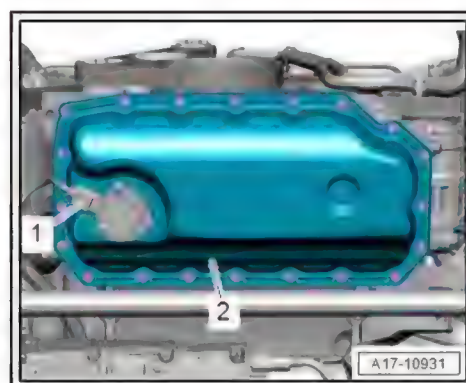


Note

*Renew bolts tightened with specified tightening angle.*

– Tighten bolts in stages as follows:

Stage	Tightening torque/angle specification
1.	8 Nm in diagonal sequence
2.	Turn 90° further in diagonal sequence

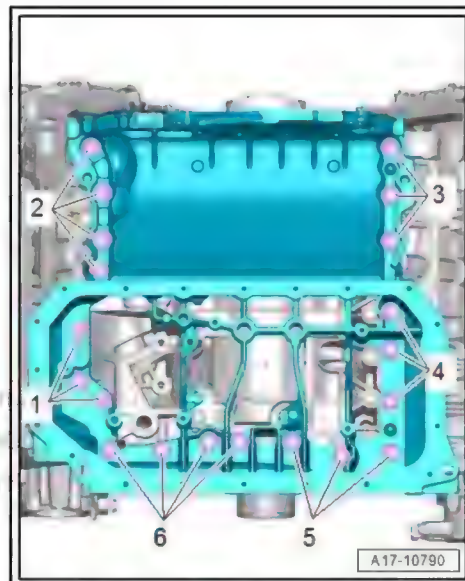


### Sump (top section) - tightening torque and sequence

- Tighten bolts -1 ... 6- in diagonal sequence and in stages to 20 Nm:

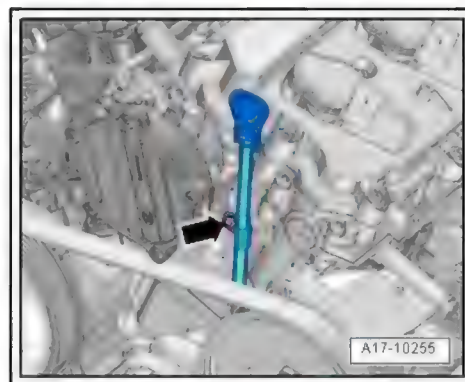


protected by copyright. Copying for private use is permitted, copying and/or forwarding to third parties is prohibited. All rights reserved. © AUDI AG. AUDI AG is not responsible for the content of this information.



### Guide tube for oil dipstick - tightening torque

- Tighten bolt -arrow- to 9 Nm.



## 1.2 Engine oil

Oil capacities, oil specifications and viscosity grades ⇒ Maintenance tables .



Caution

*Risk of damage to catalytic converter.*

- ◆ *The oil level must not be above the "MAX" mark on the dipstick.*

## 1.3 Removing and installing sump (bottom section)


Special tools and workshop equipment required

- ◆ Electric drill with plastic brush attachment
- ◆ Safety goggles
- ◆ Sealant ⇒ Electronic parts catalogue

Removing

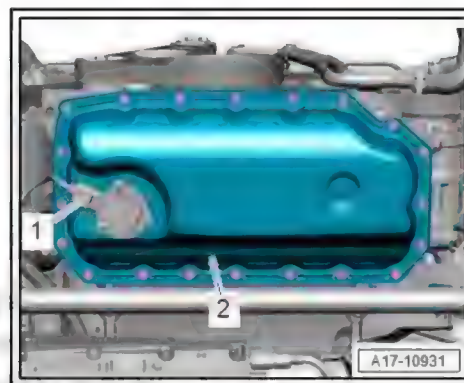
- Engine oil drained ⇒ Maintenance ; Booklet 411

- Unplug electrical connector -1- at oil level and oil temperature sender - G266- and move electrical wiring clear.

 **Caution**

*Take care to keep components clean.*

◆ *There will still be some oil in the sump (bottom section).*




- Loosen bolts for sump (bottom section) -2- in diagonal sequence and remove bolts.
- Release sump (bottom section) from bonded joint e.g. with a spatula, taking care not to bend sump.

#### Installing


 **Note**

- ◆ *Renew seals after removing.*
- ◆ *The sump (bottom section) must be renewed if its coating is damaged or if it is bent.*

 **Caution**

*Protect lubrication system and bearings against contamination.*

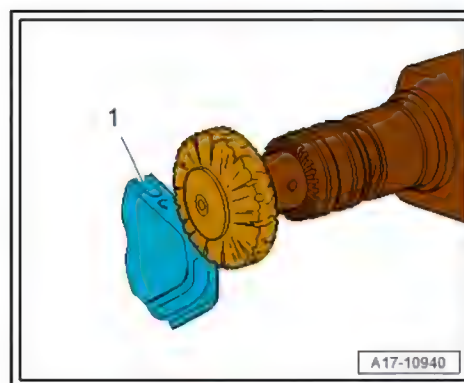
◆ *Cover exposed parts of the engine.*

 **WARNING**

*Risk of eye injury.*

◆ *Put on safety goggles.*

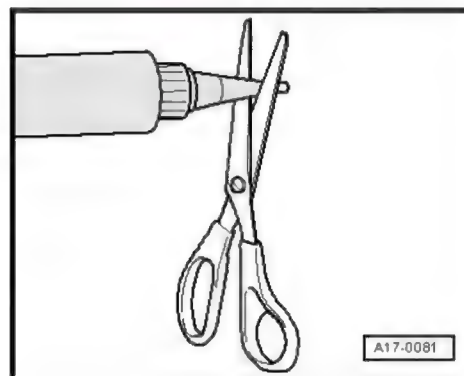
- Remove remaining sealant on bottom section -1- and top section of sump with a rotating plastic brush or similar.
- Clean surfaces; they must be free of oil and grease.



 **Note**

*Note the use-by date of the sealant.*

- Cut off nozzle of tube at front marking (nozzle Ø approx. 1 mm).





### Caution

*Make sure lubrication system is not clogged by excess sealant.*

- ◆ *The sealant bead must not be thicker than specified.*

- Apply sealant bead -arrow- onto clean sealing surface of sump (bottom section) as shown in illustration.
- Width of sealant bead: approx. 1.5 mm.



### Note

*The sump (bottom section) must be installed within 5 minutes after applying the sealant.*

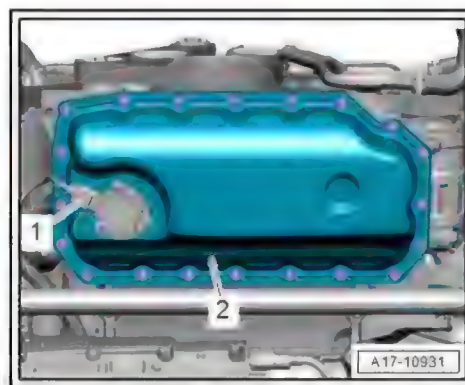
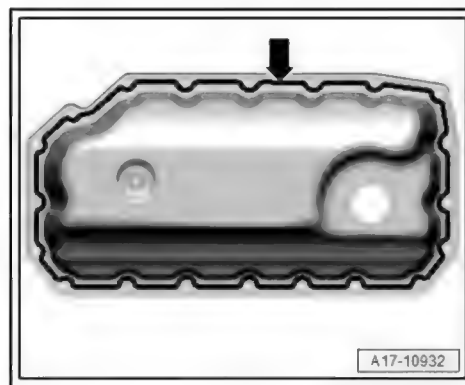
- Fit sump (bottom section) -2-, tighten bolts  
⇒ [Fig. "Sump \(bottom section\) - tightening torque and sequence", page 157](#) and plug in electrical connector -1-.

Remaining installation steps are carried out in reverse sequence; note the following:

- Fill with engine oil and check oil level ⇒ Maintenance ; Booklet 411 .

### Tightening torques

- ◆ ⇒ [Fig. "Sump \(bottom section\) - tightening torque and sequence", page 157](#)



## 1.4 Removing and installing sump (top section)

### Special tools and workshop equipment required

- ◆ Safety goggles
- ◆ Electric drill with plastic brush attachment
- ◆ Sealant ⇒ Electronic parts catalogue

### Removing

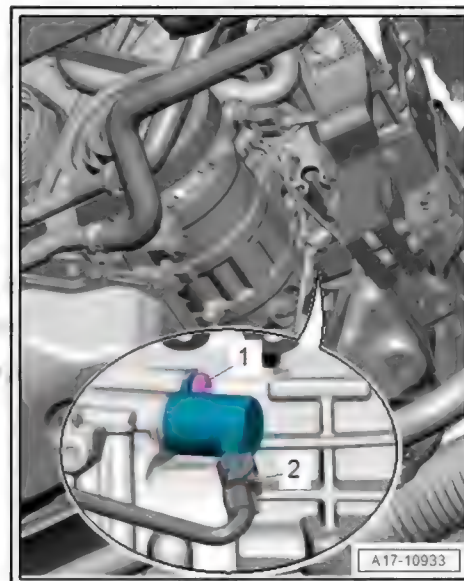
- Engine secured to engine and gearbox support  
⇒ ["1.3 Securing engine to engine and gearbox support", page 28](#) .
- Remove timing chain cover (bottom)  
⇒ ["1.2.3 Removing and installing timing chain cover \(bottom\)", page 86](#) .
- Remove oil pump  
⇒ ["1.5 Removing and installing oil pump", page 163](#) .

- Unplug electrical connector -2-.



Note

*Disregard -item 1-.*



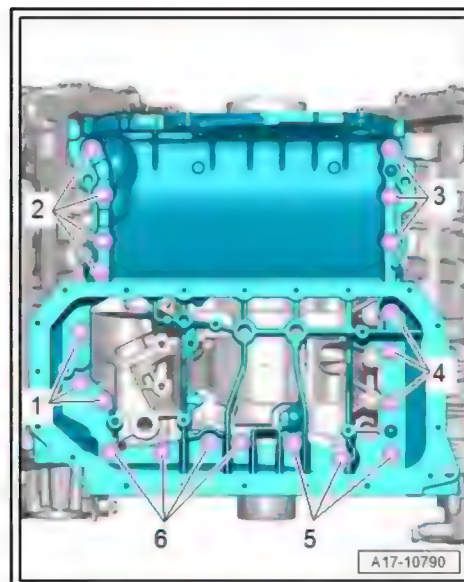
- Slacken bolts -1 ... 6- for sump (top section) in diagonal sequence and remove.
- Carefully release sump (top section) from bonded joint and pry sump off dowel pins on cylinder block.

Installing



Note

*Renew seal and O-ring after removal.*





### Caution

*Protect lubrication system and bearings against contamination.*

- ◆ *Cover exposed parts of the engine.*

- Remove old sealant from grooves on sump (top section) and from sealing surface.



### WARNING

*Risk of eye injury.*

- ◆ *Put on safety goggles.*

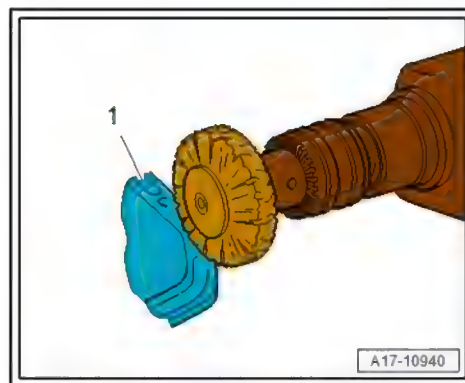
- Remove remaining sealant from sump (top section) -1- and cylinder block using rotating plastic brush or similar.
- Clean surfaces; they must be free of oil and grease.



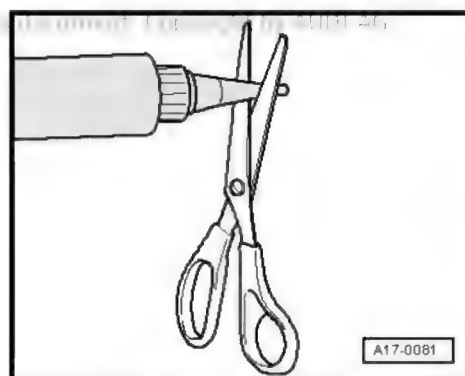
### Note

*Note the use-by date of the sealant.*

- Cut off nozzle of tube at front marking (nozzle Ø approx. 1.5 mm).



A17-10940



A17-0081



### Caution

*Make sure lubrication system is not clogged by excess sealant.*

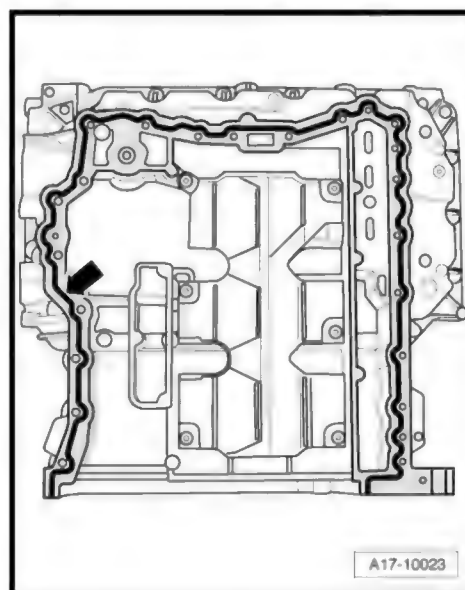
- ◆ *The sealant bead must not be thicker than specified.*

- Apply bead of sealant -arrow- onto clean sealing surface of sump (top section) as shown in illustration.
- The grooves on the sealing surfaces must be completely filled with sealant.
- The bead of sealant must project 1.5 ... 2.0 mm above the sealing surface.



### Note

*The sump (top section) must be installed within 5 minutes after applying the sealant.*



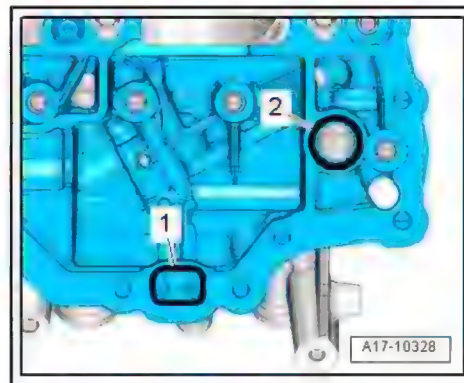
A17-10023

- Fit seal -1- into retaining frame.



Note

*Disregard -item 2-.*



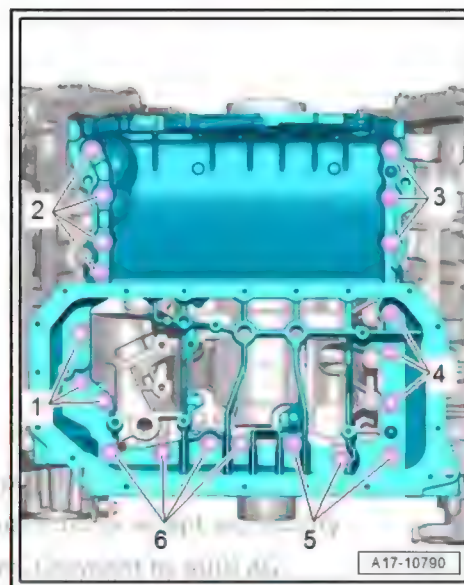
- Check that dowel sleeves are fitted, fit sump (top section) and tighten bolts  
⇒ [Fig. "Sump \(top section\) - tightening torque and sequence", page 158](#).

Remaining installation steps are carried out in reverse sequence; note the following:

- Install oil pump  
⇒ ["1.5 Removing and installing oil pump", page 163](#).
- Install timing chain cover (bottom)  
⇒ ["1.2.3 Removing and installing timing chain cover \(bottom\)", page 86](#).

Tightening torques

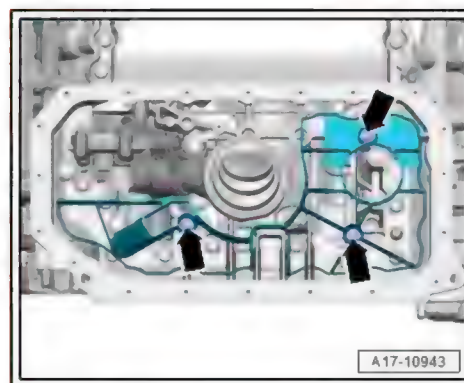
- ◆ ⇒ ["1.1 Exploded view - sump/oil pump", page 155](#)
- ◆ ⇒ [Fig. "Sump \(top section\) - tightening torque and sequence", page 158](#)



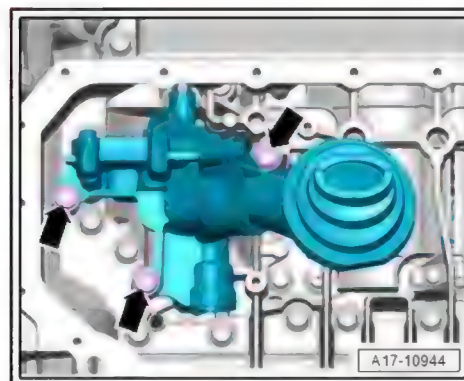
## 1.5 Removing and installing oil pump

Removing

- Remove sump (bottom section)  
⇒ ["1.3 Removing and installing sump \(bottom section\)", page 158](#).
- Remove bolts -arrows- and detach baffle plate.



- Remove bolts -arrows-.



- Using pliers -2-, press drive shaft -1- back against spring pressure and detach oil pump -3-.



Note

*Oil pump drive shaft remains in position.*

Installing

Installation is carried out in reverse order; note the following:



Note

*Renew O-rings.*

- Install sump (bottom section)  
⇒ ["1.3 Removing and installing sump \(bottom section\)", page 158](#) .
- Fill with engine oil and check oil level ⇒ Maintenance ; Booklet 411 .

Tightening torques

- ◆ ⇒ ["1.1 Exploded view - sump/oil pump", page 155](#)

## 1.6 Removing and installing oil level and oil temperature sender - G266-

Removing

- Engine oil drained ⇒ Maintenance ; Booklet 411
- Unplug electrical connector -2-.
- Remove nuts -1- and detach oil level and oil temperature sender - G266- -item 3-.

Installing

Installation is carried out in reverse order; note the following:



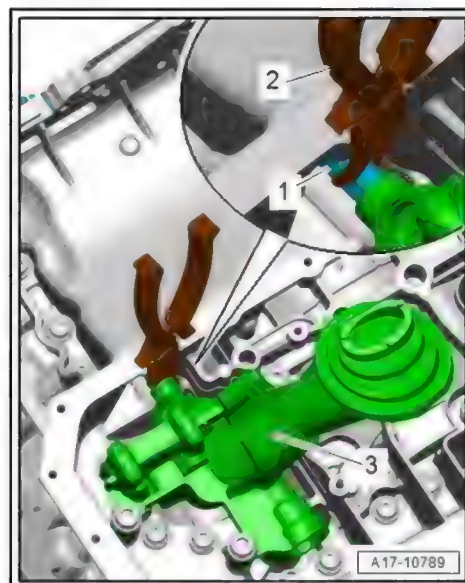
Note

*Renew seal -4- after removing.*

- Fill with engine oil and check oil level ⇒ Maintenance ; Booklet 411 .

Tightening torques

- ◆ ⇒ ["1.1 Exploded view - sump/oil pump", page 155](#)



## 2 Engine oil cooler

⇒ ["2.1 Exploded view - engine oil cooler", page 165](#)

⇒ ["2.2 Removing and installing engine oil cooler", page 165](#)

### 2.1 Exploded view - engine oil cooler

#### 1 - Engine oil cooler

- ☐ With oil cooler bypass valve
- ☐ See note ⇒ [page 155](#)
- ☐ Removing and installing  
⇒ ["2.2 Removing and installing engine oil cooler", page 165](#)

#### 2 - Bracket

#### 3 - Bolt

- ☐ Renew after removing
- ☐ 3 Nm +90°

#### 4 - Coolant hose

#### 5 - Timing chain cover (bottom)

#### 6 - Seal

- ☐ Renew after removing

#### 7 - Coolant pipe (top)

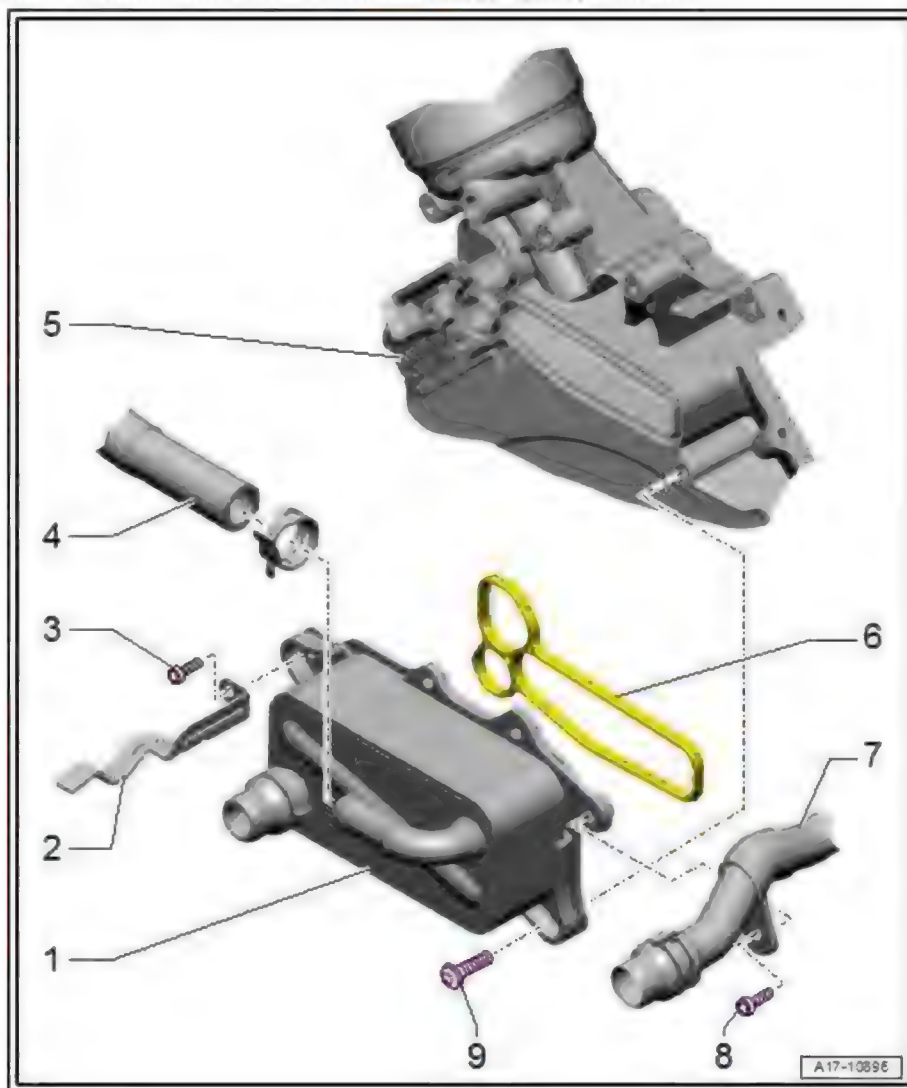
- ☐ Removing and installing  
⇒ ["3.2.5 Removing and installing coolant pipe \(top\)", page 216](#)

#### 8 - Bolt

- ☐ Tightening torque  
⇒ [Item 19 \(page 206\)](#)

#### 9 - Bolt

- ☐ Renew after removing
- ☐ 3 Nm +90°



### 2.2 Removing and installing engine oil cooler

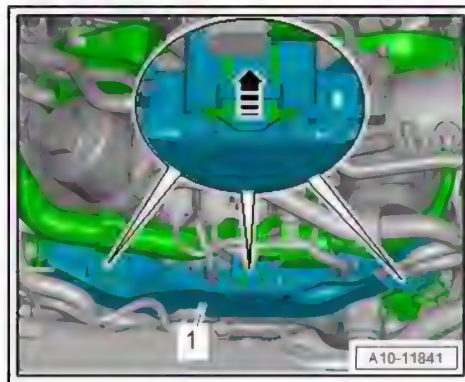
Special tools and workshop equipment required

- ◆ Hose clip pliers - VAS 6362-

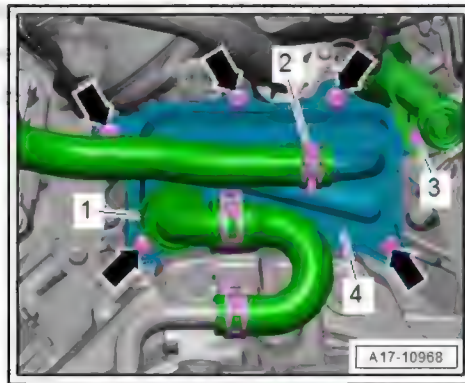


### Removing

- Drain coolant  
⇒ ["1.3 Draining and filling cooling system", page 183](#) .
- Remove plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Exploded view - plenum chamber partition panel .
- Release retainers -arrow-, detach wiring duct -1- towards rear and push it upwards.



- Move electrical wiring and hoses to side.
- Lift retaining clip -1-, release hose clip -2- and disconnect coolant hoses.
- Unscrew bolts -3- and -arrows- and detach engine oil cooler -4- to left side.



### Installing

Installation is carried out in reverse order; note the following:



#### Note

- ◆ *Renew bolts tightened with specified tightening angle.*
- ◆ *Renew gasket after removing.*
- ◆ *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*
- ◆ *Do not reuse coolant.*
- Fill up with coolant ⇒ [page 185](#) .

### Tightening torques

- ◆ ⇒ ["1.1 Exploded view - sump/oil pump", page 155](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Exploded view - plenum chamber partition panel

### 3 Crankcase breather

⇒ ["3.1 Exploded view - crankcase breather system", page 167](#)

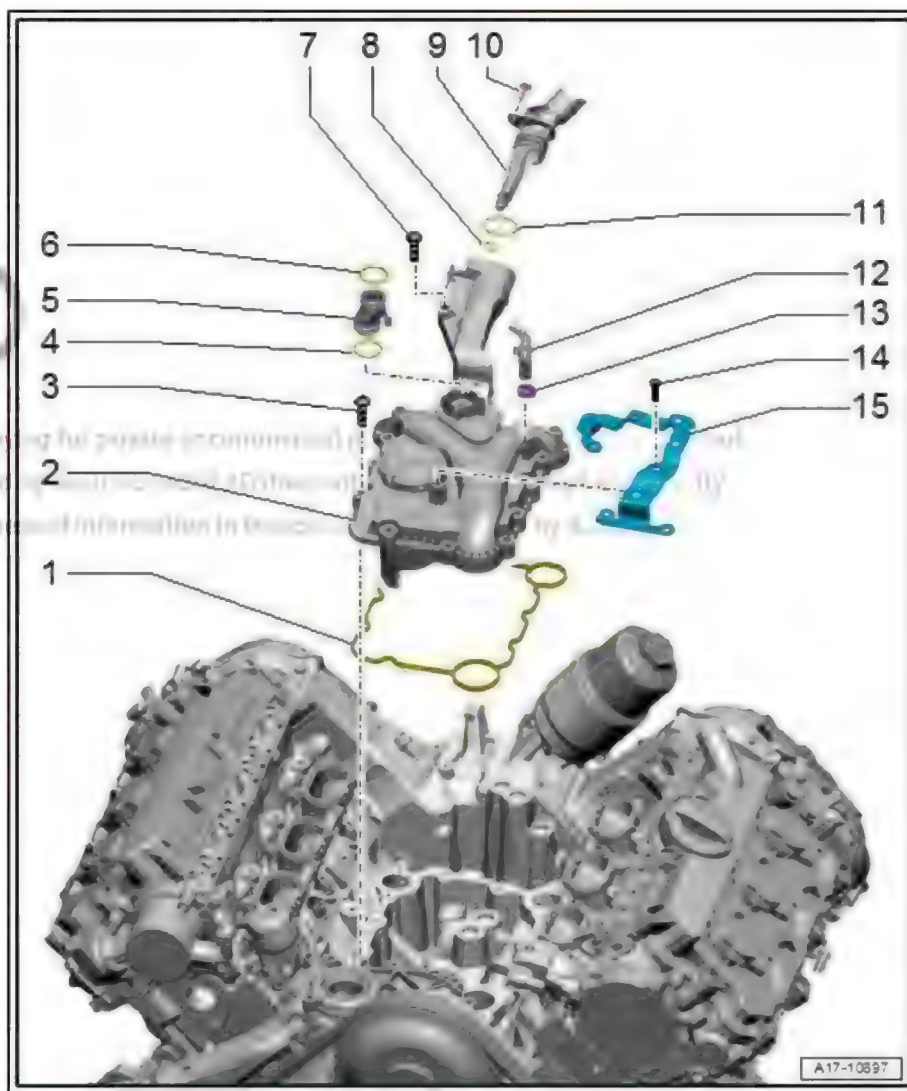
⇒ ["3.2 Removing and installing oil separator", page 168](#)

⇒ ["3.3 Removing and installing hose for crankcase breather system", page 169](#)

⇒ ["3.4 Removing and installing crankcase breather shut-off valve N548", page 170](#)

#### 3.1 Exploded view - crankcase breather system

- 1 - Gasket
  - ☐ Renew after removing
- 2 - Oil separator with cover
  - ☐ With connection for crankcase breather
  - ☐ Removing and installing  
⇒ ["3.2 Removing and installing oil separator", page 168](#)
- 3 - Bolt
  - ☐ 9 Nm
- 4 - O-ring
  - ☐ Renew after removing
  - ☐ 2x on NAR versions
- 5 - Connection
  - ☐ For crankcase breather
  - ☐ Installation position  
⇒ [Fig. "Installing connection for crankcase breather", page 168](#)
- 6 - O-ring
  - ☐ Renew after removing
  - ☐ 2x on NAR versions
- 7 - Bolt
  - ☐ 9 Nm
- 8 - O-ring
  - ☐ Renew after removing
- 9 - Crankcase breather hoses
  - ☐ To cylinder head covers
  - ☐ Removing and installing  
⇒ ["3.3 Removing and installing hose for crankcase breather system", page 169](#)
- 10 - Bolt
  - ☐ 2.5 Nm
- 11 - O-ring
  - ☐ Renew after removing
- 12 - Crankcase breather hose
  - ☐ To air pipe
  - ☐ With crankcase breather shut-off valve - N548-





- ❑ Removing and installing

⇒ ["3.4 Removing and installing crankcase breather shut-off valve N548"](#), page 170

### 13 - Hose clip

- ❑ Not fitted on all versions; for allocation, refer to ⇒ Electronic parts catalogue

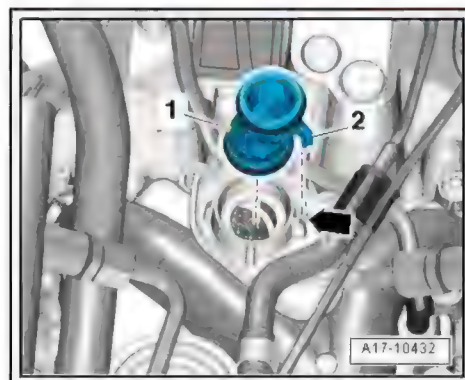
### 14 - Bolt

- ❑ 2.5 Nm

### 15 - Bracket

## Installing connection for crankcase breather

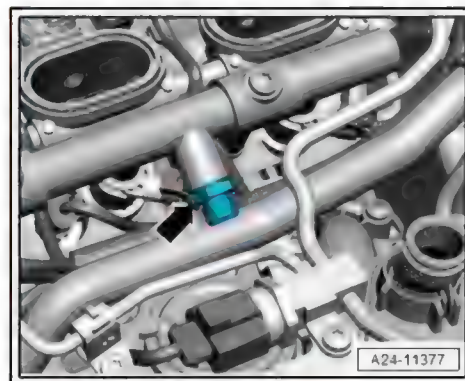
- Insert connection -1- for crankcase breather with new O-rings in cover for oil separator.
- Installation position: lug -2- must engage in guide -arrow-.



## 3.2 Removing and installing oil separator

### Removing

- Remove coolant pipe (top)  
⇒ ["3.2.5 Removing and installing coolant pipe \(top\)"](#), page 216 .
- Remove fuel pressure sender - G247-  
⇒ ["6.2 Removing and installing fuel pressure sender G247"](#), page 318 .
- Unscrew connection -arrow- (left and right).

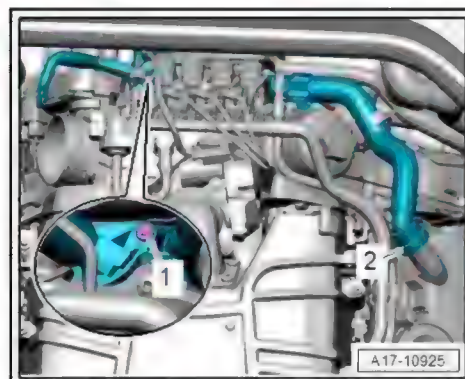


- Remove bolt -1-.
- Detach connection with crankcase breather hose.



### Note

- ◆ The illustration shows the installation position with the supercharger installed.
- ◆ Disregard -item 2-.



- Remove bolts -2- and -arrows-.
- Detach bracket -3-.
- Push electrical wiring and vacuum hoses to one side and detach oil separator with cover.

 Note

*Disregard -item 1-.*

Installing

Installation is carried out in reverse order; note the following:

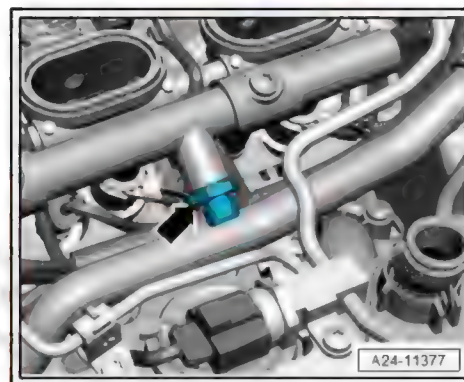
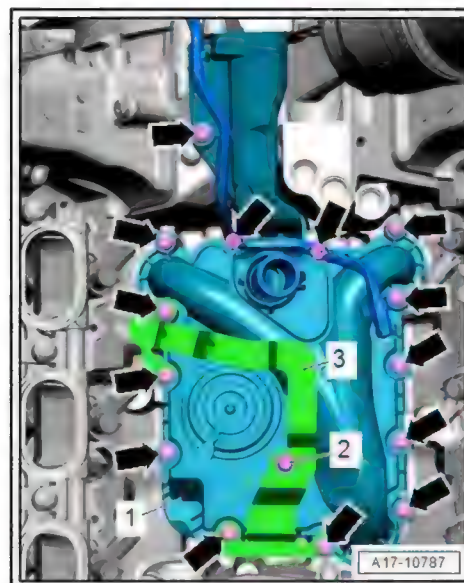
 Note

*Renew gasket after removing.*

- Renew connection -arrow-.
- Install fuel pressure sender - G247-  
⇒ ["6.2 Removing and installing fuel pressure sender G247", page 318](#).
- Install coolant pipe (top)  
⇒ ["3.2.5 Removing and installing coolant pipe \(top\)", page 216](#).

Tightening torques

- ◆ ⇒ ["3.1 Exploded view, crankcase breather system", page 167](#)



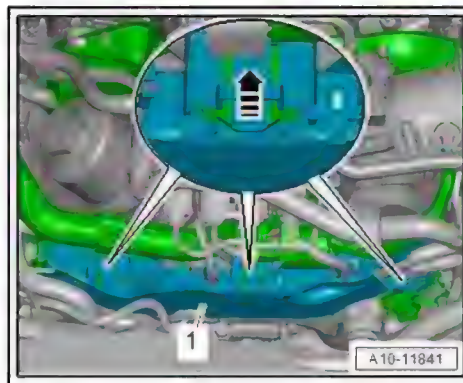
### 3.3 Removing and installing hose for crankcase breather system

Removing

 Note

- ◆ *Re-install all cable ties in the same locations when installing.*
- ◆ *Crankcase breather hose cannot be detached from cylinder head cover (left-side) without being irreparably damaged. Always renew hose after removal.*
- Remove throttle valve module - J338-  
⇒ ["4.3 Removing and installing throttle valve module J338", page 301](#).

- Release fasteners -arrow- and detach wiring duct -1- towards rear.



- Detach crankcase breather hose -2- from cylinder head covers.
- Move crankcase breather hose clear.
- Remove bolt -1- and detach connection with crankcase breather hose.

#### Installing

Installation is carried out in reverse order; note the following:



Note

*Renew O-rings after removing.*

- Install throttle valve module - J338-  
⇒ ["4.3 Removing and installing throttle valve module J338"](#),  
[page 301](#) .

#### Tightening torques

- ♦ ⇒ ["3.1 Exploded view - crankcase breather system"](#),  
[page 167](#)

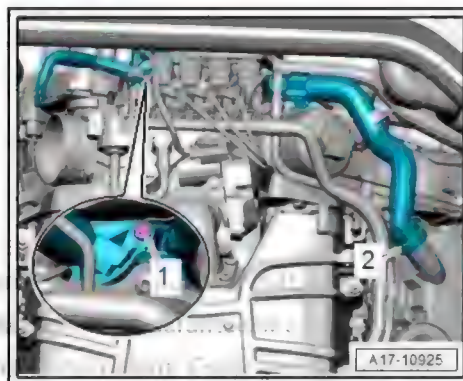
### 3.4 Removing and installing crankcase breather shut-off valve - N548-

#### Removing



Note

- ♦ *Re-fit all cable ties and heat insulation sleeves in the same locations when installing.*
- ♦ *The crankcase breather shut-off valve - N548- and the connecting hose are combined as one component and cannot be removed individually.*
- Remove supercharger  
⇒ ["1.4 Removing and installing supercharger"](#), [page 244](#) .



- If fitted, release clip -1-, pull crankcase breather hose -2- off oil separator -magnified view- and unclip it from bracket -arrow-.
- Remove crankcase breather shut-off valve - N548- together with crankcase breather hose -2-.

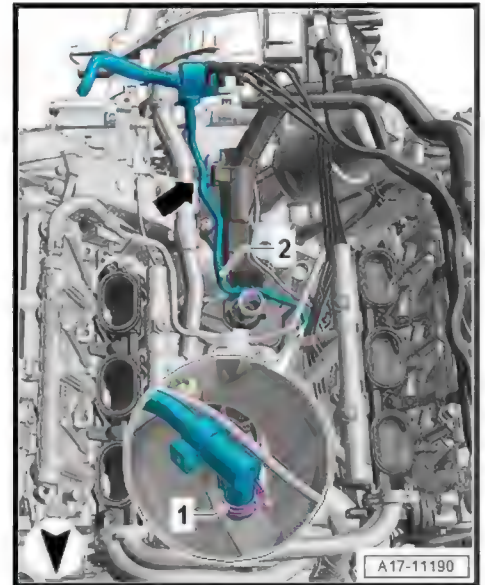
#### Installing

Installation is carried out in reverse order; note the following:



*Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*

- Install supercharger  
⇒ ["1.4 Removing and installing supercharger", page 244 .](#)



© 2018 Audi AG. All rights reserved. Audi is a registered trademark of Audi AG. Audi is not responsible for the content and accuracy of the information provided in this document. Audi AG is not responsible for the content and accuracy of the information provided in this document. Audi AG is not responsible for the content and accuracy of the information provided in this document.

## 4 Oil filter/oil pressure switches

⇒ "4.1 Exploded view - oil filter", page 172

⇒ "4.2 Exploded view - oil pressure switches/oil pressure control", page 173

⇒ "4.3 Removing and installing oil pressure switch F22", page 173

⇒ "4.4 Removing and installing oil pressure switch for reduced oil pressure F378", page 174

⇒ "4.5 Checking oil pressure", page 175

⇒ "4.6 Removing and installing valve for oil pressure control N428", page 176

### 4.1 Exploded view - oil filter

#### 1 - Oil filter housing

- ☐ With filter bypass valve
- ☐ With oil drain valve
- ☐ Combined as one unit with timing chain cover (bottom)

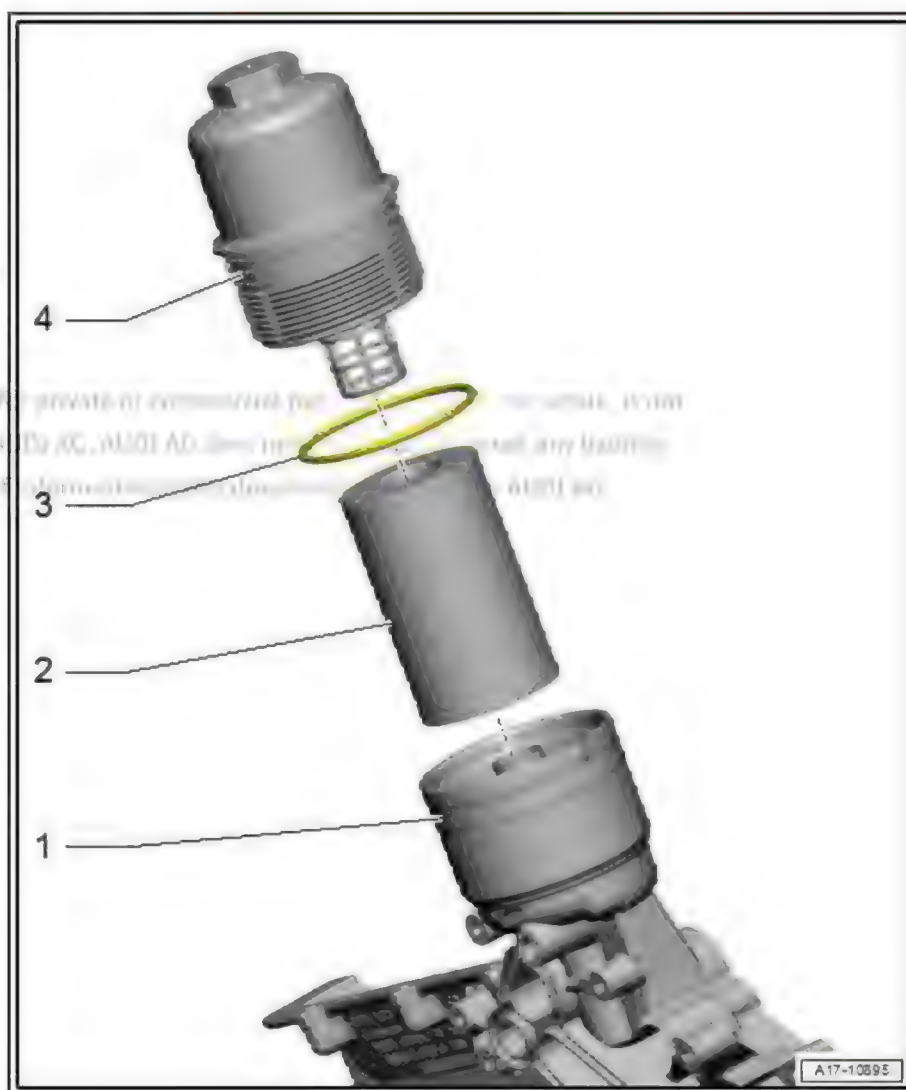
#### 2 - Oil filter element

- ☐ Removing and installing ⇒ Maintenance ; Booklet 411

#### 3 - Seal

#### 4 - Sealing cap

- ☐ 25 Nm



## 4.2 Exploded view - oil pressure switches/oil pressure control

### 1 - Seal

- ☐ Renew after removing

### 2 - Oil pressure switch - F22-

- ☐ Opening/closing pressure 2.5 ... 3.2 bar (high pressure stage of oil pump)
- ☐ Black insulation
- ☐ Check in Guided Fault Finding ⇒ Vehicle diagnostic tester
- ☐ Removing and installing  
⇒ ["4.3 Removing and installing oil pressure switch F22", page 173](#)
- ☐ 20 Nm

### 3 - Oil pressure switch for reduced oil pressure - F378-

- ☐ Opening/closing pressure 0.75 ... 1.05 bar (low pressure stage of oil pump)
- ☐ Light grey insulation
- ☐ Check in Guided Fault Finding ⇒ Vehicle diagnostic tester
- ☐ Removing and installing  
⇒ ["4.4 Removing and installing oil pressure switch for reduced oil pressure F378", page 174](#)
- ☐ 20 Nm

### 4 - Seal

- ☐ Renew after removing

### 5 - Bolt

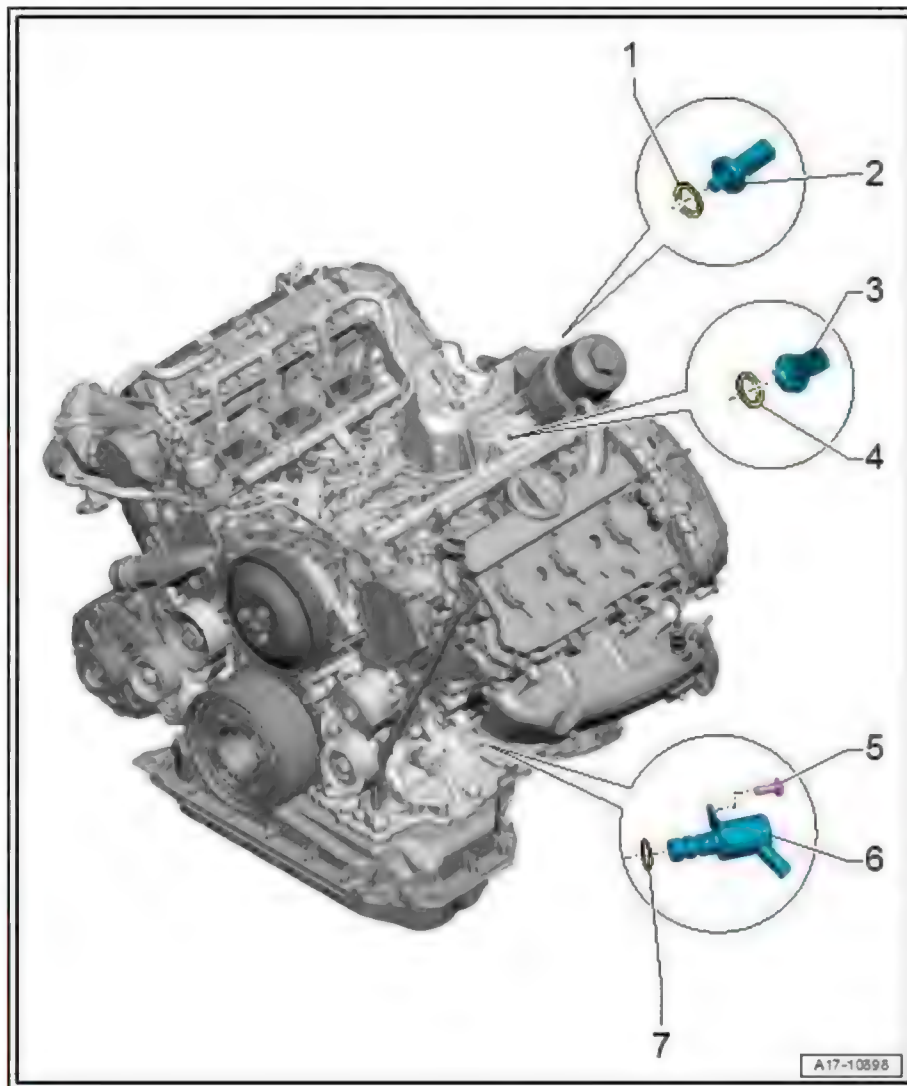
- ☐ 9 Nm

### 6 - Valve for oil pressure control - N428-

- ☐ Check in Guided Fault Finding ⇒ Vehicle diagnostic tester
- ☐ Removing and installing  
⇒ ["4.6 Removing and installing valve for oil pressure control N428", page 176](#)

### 7 - O-ring

- ☐ Renew after removing



## 4.3 Removing and installing oil pressure switch - F22-

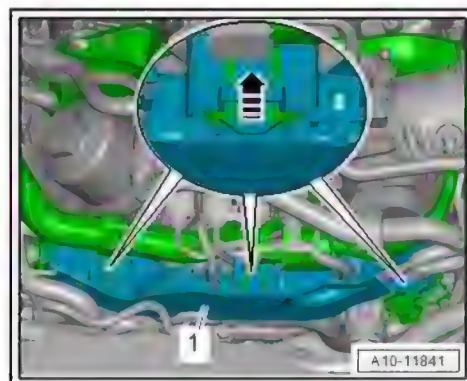
Special tools and workshop equipment required

- ◆ Articulated wrench, 24 mm - T40175-



## Removing

- Remove throttle valve module - J338-  
⇒ ["4.3 Removing and installing throttle valve module J338", page 301](#) .
- Release fasteners -arrow- and detach wiring duct -1- towards rear.
- Move electrical wiring and hoses clear and press to one side.



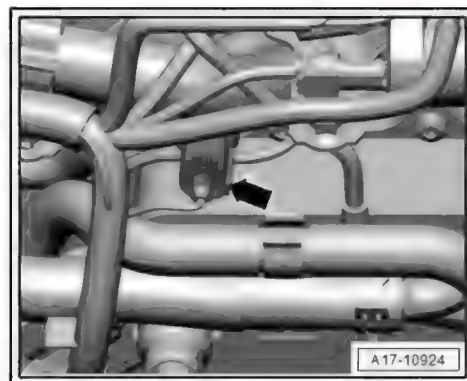
## Note

Place a cloth beneath the oil filter housing to catch escaping oil.

- Unplug electrical connector -arrow-.
- Use articulated wrench, 24 mm - T40175- to unscrew oil pressure switch - F22- .

## Installing

Installation is carried out in reverse order; note the following:



## Note

- ◆ *Renew seal after removing.*
- ◆ *Fit the new oil pressure switch - F22- into the connection immediately to avoid loss of engine oil.*
- Install throttle valve module - J338-  
⇒ ["4.3 Removing and installing throttle valve module J338", page 301](#) .
- Check oil level ⇒ Maintenance ; Booklet 411 .

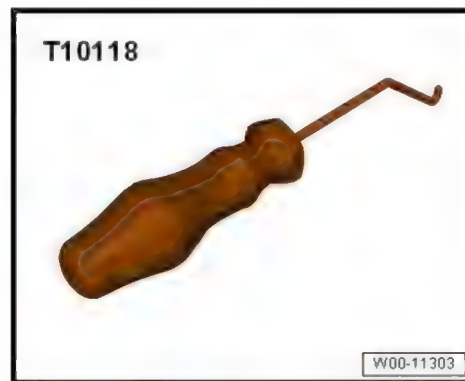
## Tightening torques

- ◆ ⇒ ["4.2 Exploded view - oil pressure switches/oil pressure control", page 173](#)

## 4.4 Removing and installing oil pressure switch for reduced oil pressure - F378-

Special tools and workshop equipment required

◆ Assembly tool - T10118-



◆ Articulated wrench, 24 mm - T40175-



Removing

- Remove supercharger  
 ⇒ ["1.4 Removing and installing supercharger", page 244](#) .
- Use assembly tool - T10118- to unplug electrical connector -2-.
- Use articulated wrench (24 mm) - T40175- to unscrew oil pressure switch for reduced oil pressure - F378- -item 1-.

Installing

Installation is carried out in reverse order; note the following:

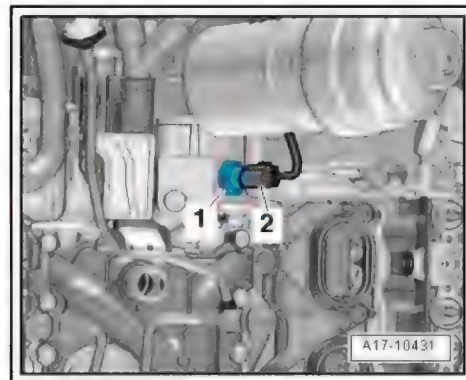


*Renew seal after removing.*

- Install supercharger  
 ⇒ ["1.4 Removing and installing supercharger", page 244](#) .

Tightening torques

- ◆ ⇒ ["4.2 Exploded view - oil pressure switches/oil pressure control", page 173](#)



## 4.5 Checking oil pressure

Special tools and workshop equipment required



◆ Oil pressure tester - V.A.G 1342-



Procedure

- Oil level OK
- Engine oil temperature approx. 80 °C
- Remove oil pressure switch - F22-  
⇒ ["4.3 Removing and installing oil pressure switch F22", page 173](#) .
- Connect oil pressure tester - V.A.G 1342- to bore for oil pressure switch.
- Screw oil pressure switch - F22- into oil pressure tester.
- Start engine.
- Minimum oil pressure at idling speed: 1.2 bar.
- Minimum oil pressure at 2000 rpm: 1.5 bar.

Assembling

- Install oil pressure switch - F22-  
⇒ ["4.3 Removing and installing oil pressure switch F22", page 173](#) .

## 4.6 Removing and installing valve for oil pressure control - N428-

Removing

- Remove noise insulation (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .

- Unplug electrical connector -2-.



Note

*Place a cloth underneath to catch escaping engine oil.*

- Remove bolt -1- and detach valve for oil pressure control - N428- .

Installing

Installation is carried out in reverse order; note the following:

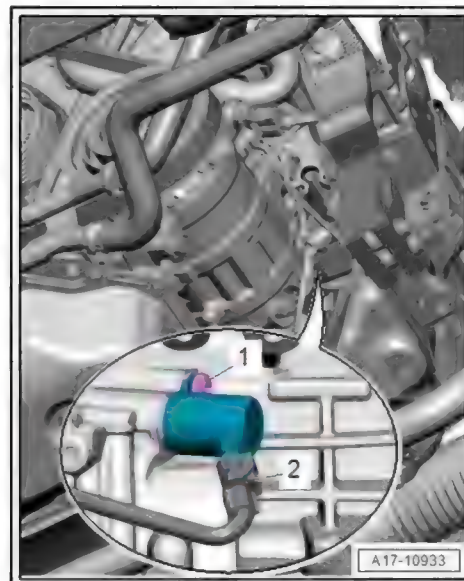


Note

*Renew O-ring after removal.*

Tightening torques

- ◆ ⇒ ["4.2 Exploded view - oil pressure switches/oil pressure control", page 173](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation



Printed by copyright. Copying for private or commercial purposes, or part or whole, is not permitted without permission by AUDI AG. AUDI AG does not guarantee its accept and liability with respect to the correctness of information or instructions. Copyright by AUDI AG.

## 19 – Cooling

### 1 Cooling system/coolant

⇒ ["1.1 Connection diagram - coolant hoses", page 178](#)

⇒ ["1.2 Checking cooling system for leaks", page 182](#)

⇒ ["1.3 Draining and filling cooling system", page 183](#)

#### 1.1 Connection diagram - coolant hoses

⇒ ["1.1.1 Connection diagram - coolant hoses, vehicles without auxiliary heater", page 178](#)

⇒ ["1.1.2 Connection diagram - coolant hoses, vehicles with auxiliary heater", page 180](#)

##### 1.1.1 Connection diagram - coolant hoses, vehicles without auxiliary heater



#### Note

- ◆ *Blue = Large coolant circuit*
- ◆ *Red = Small coolant circuit*
- ◆ *Orange = Coolant circuit for charge air cooler.*
- ◆ *Brown = Heating circuit*
- ◆ *Green = Coolant circuit for gearbox*
- ◆ *Arrows show direction of coolant flow.*



Printed by Volkswagen Group for private commercial purposes. It is not permitted to reproduce or use this document for any other purpose without the written permission of Audi AG. Audi AG does not guarantee the accuracy of the information in this document. Copyright by Audi AG.

1 - Water radiator for charge air cooling circuit

2 - Radiator

3 - Coolant temperature sender - G62-

4 - Thermostat

5 - Coolant pump

6 - Charge air cooler (right-side)

☐ In supercharger housing

7 - Bleeder screw

8 - Cylinder head

☐ Cylinder bank 1 (right-side)

9 - Temperature sender for engine temperature regulation - G694-

10 - Coolant circulation pump - V50-

11 - Bleeder screw

12 - Heat exchanger for heater

☐ Removing and installing  
⇒ Heating, air conditioning; Rep. gr. 87  
Front air conditioning unit; Removing and installing heat exchanger

13 - Restrictor

14 - Engine oil cooler

15 - ATF cooler

☐ Removing and installing:

◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; ATF circuit; Exploded view - ATF circuit

◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; ATF circuit; Exploded view - ATF circuit

16 - Coolant valve for gearbox - N488-

17 - Cylinder head

☐ Cylinder bank 2 (left-side)

18 - Bleeder screw

19 - Filler cap

☐ Checking pressure relief valve ⇒ [page 183](#)

20 - Coolant expansion tank

21 - Charge air cooler (left-side)

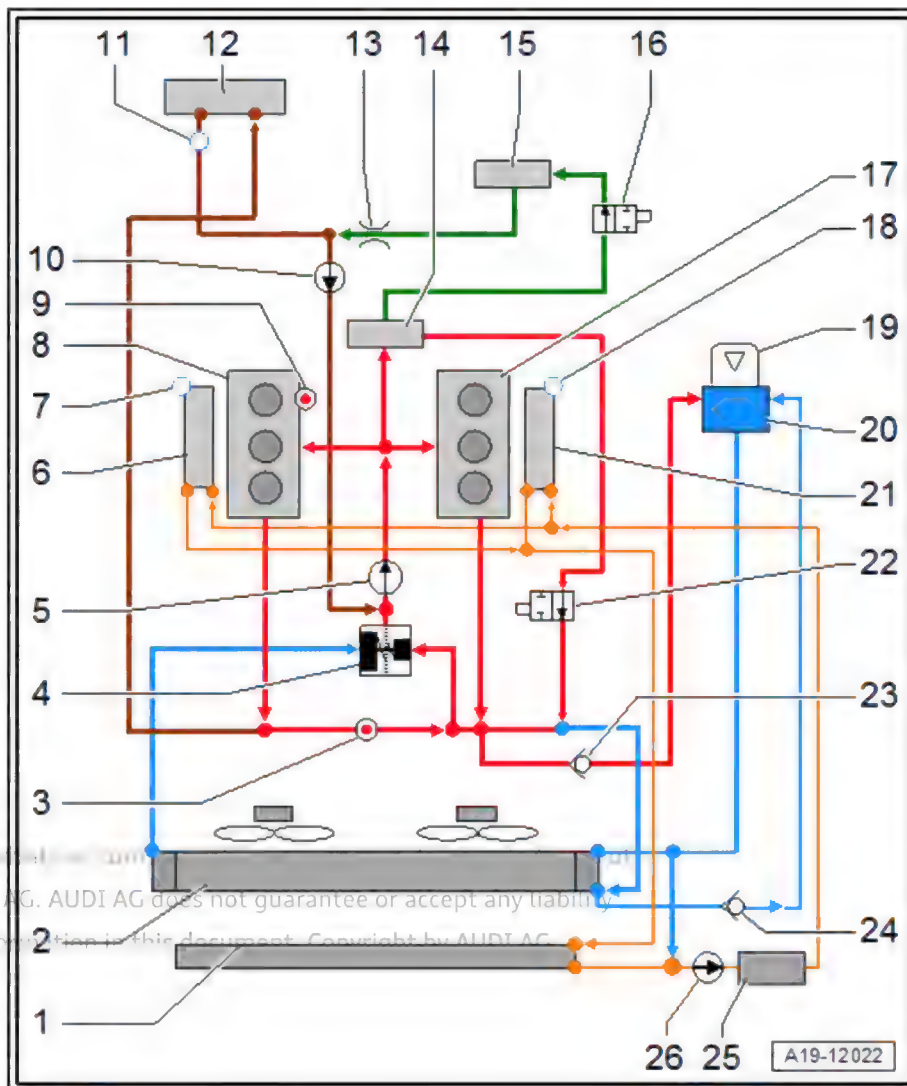
☐ In supercharger housing

22 - Coolant shut-off valve

☐ Vacuum-controlled by solenoid for coolant circuit - N492-

23 - Non-return valve

☐ Located in coolant hose



#### 24 - Non-return valve

- ☐ Located in coolant hose

#### 25 - Auxiliary radiator

- ☐ Depending on vehicle equipment

#### 26 - Charge air cooling pump - V188-

### 1.1.2 Connection diagram - coolant hoses, vehicles with auxiliary heater



#### Note

- ◆ *Blue = Large coolant circuit*
- ◆ *Red = Small coolant circuit*
- ◆ *Orange = Coolant circuit for charge air cooler.*
- ◆ *Brown = Heating circuit*
- ◆ *Green = Coolant circuit for gearbox*
- ◆ *Arrows show direction of coolant flow.*

#### 1 - Water radiator for charge air cooling circuit

#### 2 - Radiator

#### 3 - Coolant temperature sender - G62-

#### 4 - Auxiliary heater

- ☐ With circulation pump - V55-
- ☐ Removing and installing  
⇒ Auxiliary/supplementary heater; Rep. gr. 82 ;  
Auxiliary/supplementary heater; Removing  
and installing auxiliary/  
supplementary heater

#### 5 - Thermostat

#### 6 - Coolant pump

#### 7 - Charge air cooler (right-side)

- ☐ In supercharger housing

#### 8 - Bleeder screw

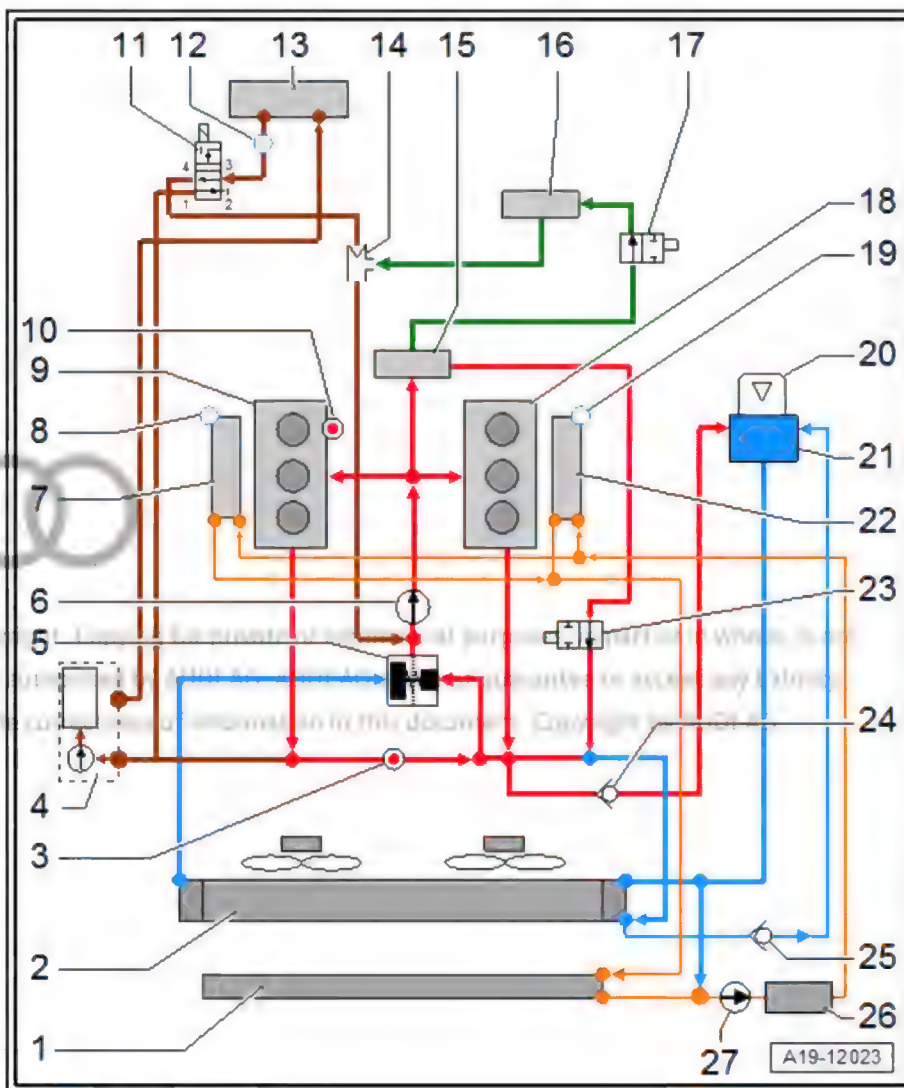
#### 9 - Cylinder head

- ☐ Cylinder bank 1 (right-side)

#### 10 - Temperature sender for engine temperature regulation - G694-

#### 11 - Heater coolant shut-off valve - N279-

- ☐ Removing and installing  
⇒ Auxiliary/supplemen-



- tary heater; Rep. gr. 82 ; Coolant circuit with auxiliary/supplementary heater; Removing and installing heater coolant shut-off valve
- 12 - Bleeder screw
- 13 - Heat exchanger for heater
- ☐ Removing and installing ⇒ Heating, air conditioning; Rep. gr. 87 ; Front air conditioning unit; Removing and installing heat exchanger
- 14 - Suction-jet pump
- 15 - Engine oil cooler
- 16 - ATF cooler
- ☐ Removing and installing:
- ◆ ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; ATF circuit; Exploded view - ATF circuit
  - ◆ ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; ATF circuit; Exploded view - ATF circuit
- 17 - Coolant valve for gearbox - N488-
- 18 - Cylinder head
- ☐ Cylinder bank 2 (left-side)
- 19 - Bleeder screw
- 20 - Filler cap
- ☐ Checking pressure relief valve ⇒ [page 183](#)
- 21 - Coolant expansion tank
- 22 - Charge air cooler (left-side)
- ☐ In supercharger housing
- 23 - Coolant shut-off valve
- ☐ Vacuum-controlled by solenoid for coolant circuit - N492-
- 24 - Non-return valve
- ☐ Located in coolant hose
- 25 - Non-return valve
- ☐ Located in coolant hose
- 26 - Auxiliary radiator
- ☐ Depending on vehicle equipment
- 27 - Charge air cooling pump - V188-

## 1.2 Checking cooling system for leaks

Special tools and workshop equipment required

<p><b>V.A.G 1274/8</b></p> 	<p><b>V.A.G 1274/9</b></p> 
<p><b>V.A.G 1274 B</b></p> 	
	<p>W19-10059</p>

- ◆ Adapter for cooling system tester - V.A.G 1274/8-
- ◆ Adapter for cooling system tester - V.A.G 1274/9-
- ◆ Cooling system tester - V.A.G 1274 B-

## Procedure

- Engine must be warm.

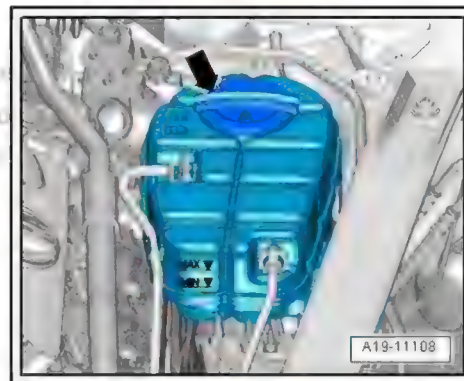


### WARNING

*The cooling system is under pressure when the engine is hot.  
Risk of scalding due to hot steam and hot coolant.*

*Danger of scalding skin and other parts of the body.*

- ◆ *Put on protective gloves.*
- ◆ *Put on safety goggles.*
- ◆ *Cover filler cap on expansion tank with a cloth and open carefully to release pressure.*

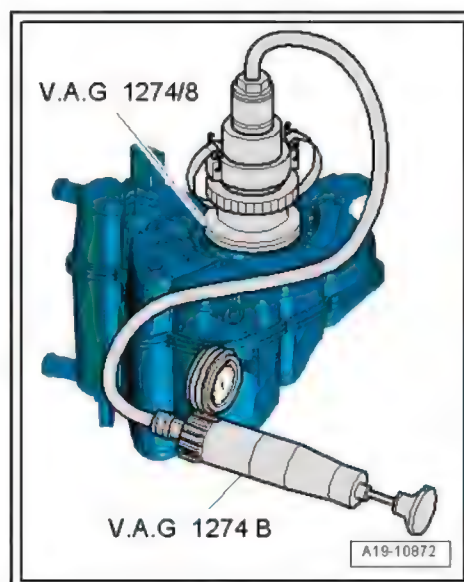


- Open filler cap -arrow- on coolant expansion tank.
- Fit cooling system tester - V.A.G 1274 B- with adapter - V.A.G 1274/8- onto coolant expansion tank.
- Using hand pump on cooling system tester, build up a pressure of approx. 1.5 bar.
- The pressure should not drop more than 0.2 bar within 10 minutes.
- If the pressure drops more than 0.2 bar, locate leak and eliminate fault.



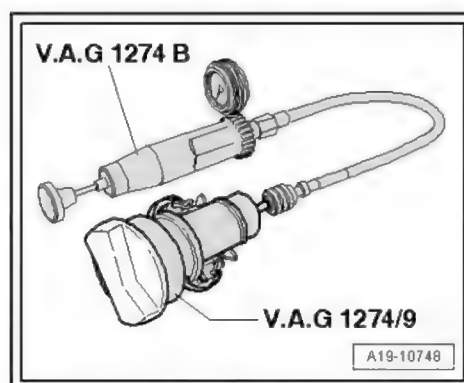
### Note

*The drop in pressure of 0.2 bar within 10 minutes is caused by the decrease in coolant temperature. The colder the engine is, the less the pressure will fall. If necessary, check again when the engine is cold.*



## Checking pressure relief valve in filler cap

- Fit cooling system tester - V.A.G 1274 B- with adapter - V.A.G 1274/9- onto filler cap.
- Build up pressure with hand pump on cooling system tester.
- The pressure relief valve should open at a pressure of 1.4 ... 1.6 bar.
- Renew filler cap if pressure relief valve does not open as described.



## 1.3 Draining and filling cooling system

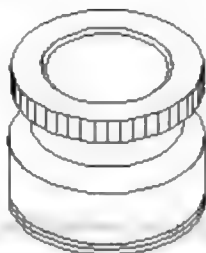


### Special tools and workshop equipment required



Unleaded diesel engine (3.0 ltr. 4-valve TFSI, EA837evo) - Edition 05.2018

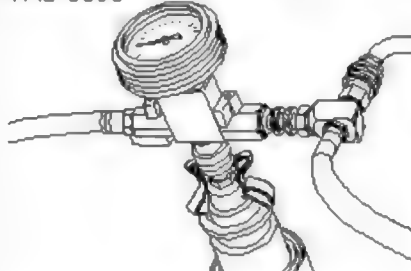
V.A.G 1274/8



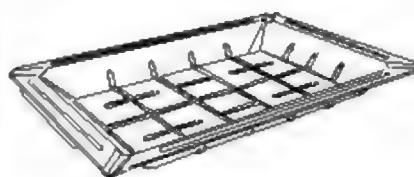
V.A.G 1274/10



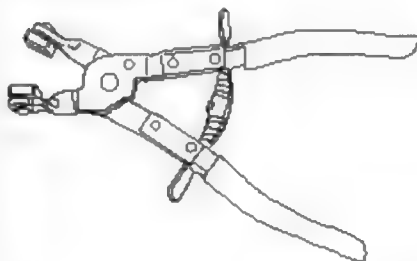
VAS 6096



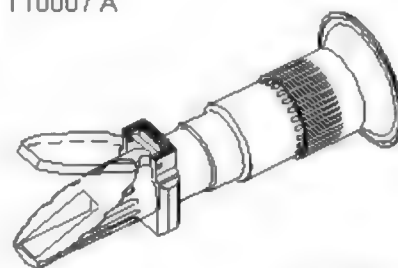
VAS 6208



VAS 6362



T10007 A



G19-10029

- ◆ Adapter for cooling system tester - V.A.G 1274/8-
- ◆ Pipe for cooling system tester - V.A.G 1274/10-
- ◆ Cooling system charge unit - VAS 6096-
- ◆ Drip tray for workshop hoist - VAS 6208-
- ◆ Hose clip pliers - VAS 6362-
- ◆ Refractometer - T10007 A-

### Draining



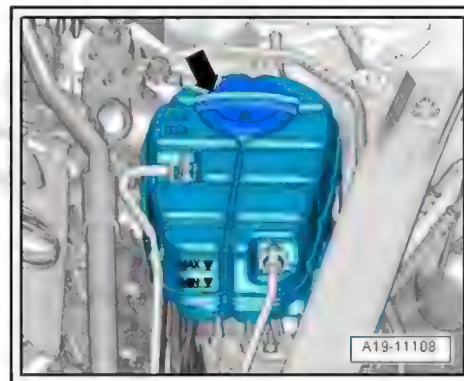
#### WARNING

*The cooling system is under pressure when the engine is hot. Risk of scalding due to hot steam and hot coolant.*

*Danger of scalding skin and other parts of the body.*

- *Put on protective gloves.*
- *Put on safety goggles.*
- *Cover filler cap on expansion tank with a cloth and open carefully to release pressure.*

- Open filler cap -arrow- on coolant expansion tank.
- Remove noise insulation panels ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation.

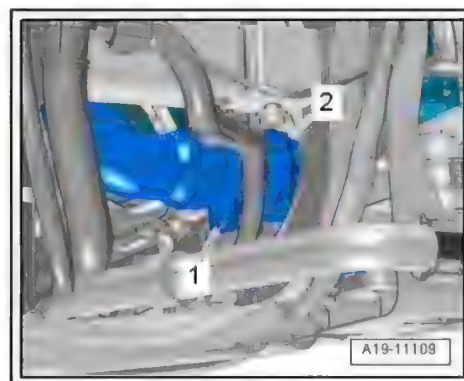


- Place drip tray for workshop hoist - VAS 6208- underneath.
- Remove drain plug -1- and drain off coolant.



Note

*Disregard -item 2-.*

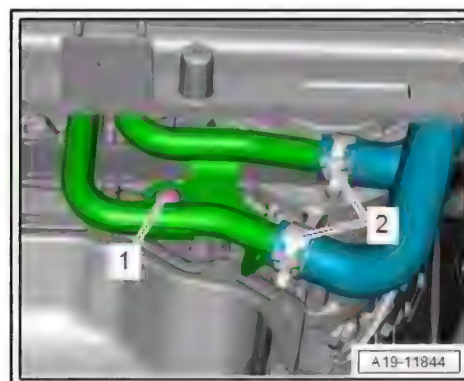


- Release hose clips -2-, disconnect coolant hoses from coolant pipes (front) and drain off coolant.



Note

*Disregard -item 1-.*



- Release hose clip -arrow-, disconnect coolant hose from coolant pipe (left-side) on gearbox and drain off coolant.

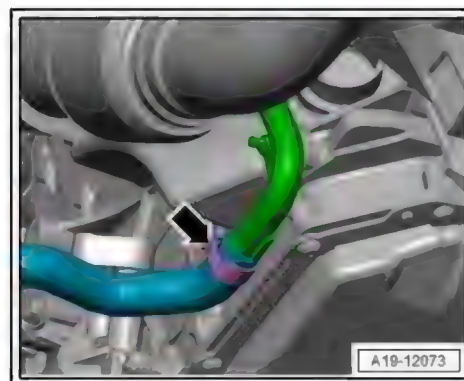
Filling

- Ignition switched off.



Caution

*To ensure optimal corrosion protection, only distilled water may be mixed with coolant additives.*

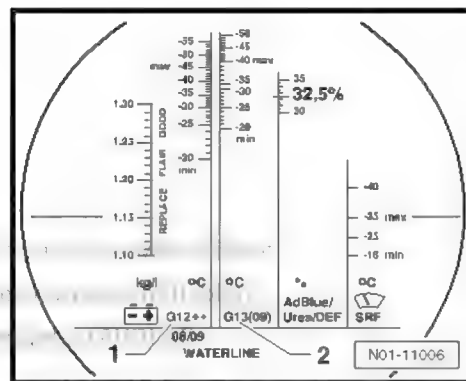


**Note**

- ◆ *The effectiveness of the coolant is greatly influenced by the quality of the water with which it is mixed. Because water may contain different substances depending on the country or even the region, the water quality to be used for cooling systems has been specified. Distilled water meets all the requirements and is therefore recommended for use when topping up or filling up with coolant.*
- ◆ *Use only coolant additives listed in the ➤ Electronic parts catalogue (ETKA) . If you use other coolant additives, this can significantly impair in particular the corrosion protection effect. The resulting damage could lead to loss of coolant and consequently to serious engine damage.*
- ◆ *Coolant with the recommended mixture ratio prevents frost and corrosion damage and stops scaling. At the same time it raises the boiling point of the fluid in the system. For this reason the cooling system must be filled all year round with the correct coolant additive.*
- ◆ *Because of its high boiling point, the coolant improves engine reliability under heavy loads, particularly in countries with tropical climates.*
- ◆ *The refractometer - T10007A- MUST be used to determine the current level of frost protection.*
- ◆ *The mixture must guarantee frost protection down to at least -25 °C (in countries with arctic climate: down to -36 °C). The amount of antifreeze should only be increased if greater frost protection is required in very cold climates. This must only be down to -48 °C, however, as otherwise the cooling efficiency of the coolant is impaired.*
- ◆ *The coolant concentration must not be reduced by adding water even in warmer seasons and in warmer countries. Frost protection must be provided to at least -25 °C.*
- ◆ *Read off the level of frost protection on the scale for the relevant coolant additive.*
- ◆ *The temperature indicated on the refractometer - T10007A- corresponds to the temperature at which the first ice crystals can form in the coolant.*
- ◆ *Do not reuse coolant.*
- ◆ *Only use water/coolant additive as a lubricant for coolant hoses.*

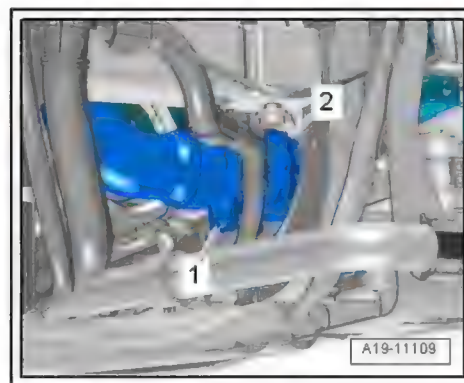
**Recommended mixture ratio for coolant**

- Coolant (40 %) and distilled water (60 %) for frost protection to -25 °C
- Coolant (50 %) and distilled water (50 %) for frost protection to -36 °C
- Coolant ➤ Electronic parts catalogue (ETKA)

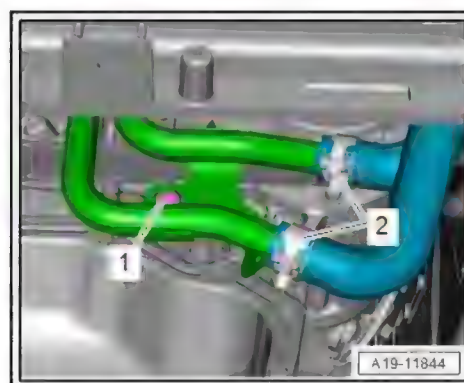


# Procedure

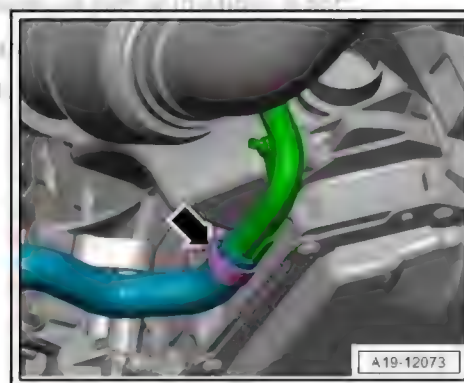
- Close drain plug -1-.



- Fit coolant hoses with hose clips -2- onto coolant pipes (front left).



- Connect coolant hose to coolant pipe (left-side) on gearbox with hose clip -arrow-.



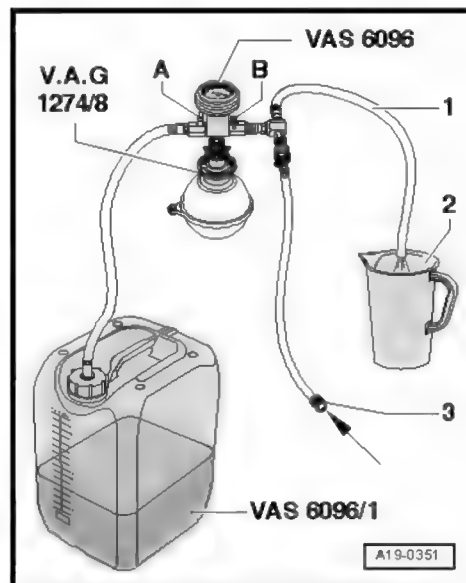
- Fill reservoir of -VAS 6096- with at least 15 litres of premixed coolant (according to recommended ratio).
- Fit adapter for cooling system tester - V.A.G 1274/8- onto coolant expansion tank.
- Attach cooling system charge unit - VAS 6096- to adapter - V.A.G 1274/8- .
- Run vent hose -1- into a small container -2-.



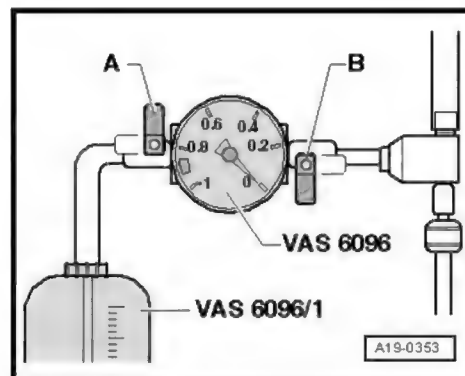
#### Note

*The vented air draws along a small amount of coolant, which should be collected.*

- Close both valves -A- and -B- (turn lever at right angles to direction of flow).
- Connect hose -3- to compressed air supply.
- Pressure: 7 ... 10 bar.
- Connect ⇒ Vehicle diagnostic tester to vehicle.
- Select following menu options on ⇒ Vehicle diagnostic tester:
  - ◆ Guided Functions mode
  - ◆ 01 - Simos fuel injection and ignition system
  - ◆ Functions - engine
  - ◆ 01 - Coolant circuit vent routine
- Follow instructions shown on vehicle diagnostic tester .

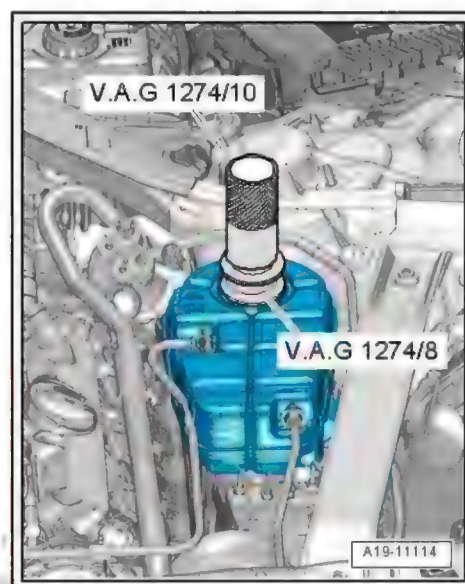


- Open valve -B- by setting lever in direction of flow.
- The suction jet pump generates a partial vacuum in the cooling system; the needle on the gauge should move into the green zone.
- Also briefly open valve -A- (turn lever in direction of flow) so that hose on reservoir of -VAS 6096- can fill with coolant.
- Close valve -A- again.
- Leave valve -B- open for another 2 minutes.
- The suction jet pump continues to generate a partial vacuum in the cooling system; the needle on the gauge should remain in the green zone.
- Close valve -B-.
- The needle on the gauge should stop in the green zone. The vacuum level in the cooling system is then sufficient for subsequent filling.



#### Note

- ◆ If the needle does not reach the green zone, repeat the process.
- ◆ Check cooling system for leaks if the vacuum is not maintained.
- Detach compressed air hose.
- Open valve -A-.
- The vacuum in the cooling system causes the coolant to be drawn out of the reservoir of -VAS 6096- ; the cooling system is then filled.
- Detach cooling system charge unit - VAS 6096- from adapter -V.A.G 1274/8- on coolant expansion tank.
- Attach pipe -V.A.G 1274/10- onto adapter -V.A.G 1274/8- .
- Fill up with coolant until pipe for cooling system tester is filled. If required, add further coolant when performing bleeding procedure.
- Remove engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#) .



1. Produced by copyright. Copying for private use without permission is prohibited. All rights reserved by Audi AG. All rights reserved. All information in this document. Copyright by Audi AG.



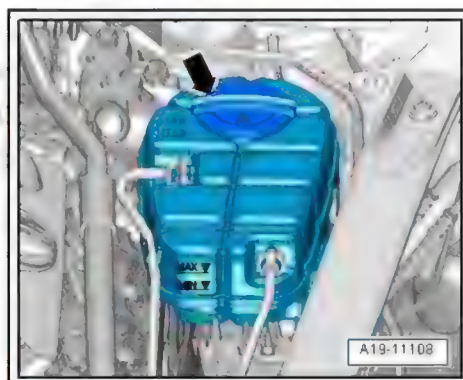
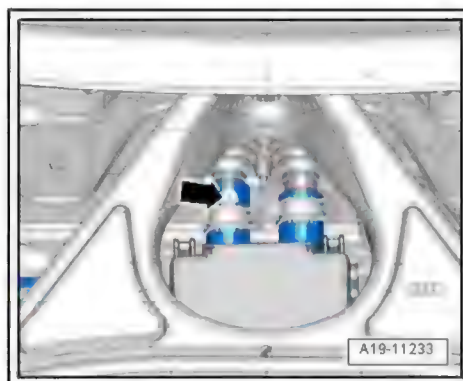
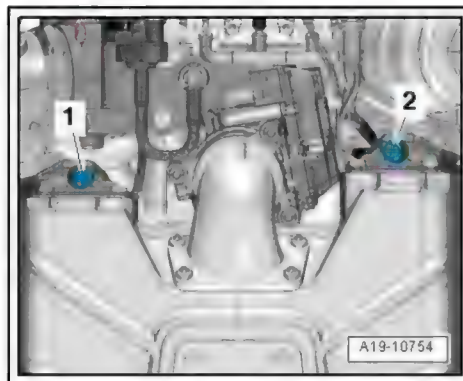
## Note

Place a cloth underneath to catch escaping coolant.

- Open bleeder screws -1- and -2- on charge air coolers one after the other until coolant comes out.
- Close bleeder screws.
- Remove plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .
- Release coolant hose going to heat exchanger and pull back hose until coolant flows out at bleeder hole -arrow- in coolant hose.
- Push coolant hose back onto connection and secure with spring-type hose clip.
- Close bleeder screw.
- On vehicles with auxiliary heater, switch heater on (for about 30 seconds) and then off again.
- Close filler cap on coolant expansion tank (make sure it engages).
- Start engine.
- Set temperature to "HI" for all zones and select lowest blower speed (= 0).
- Switch off air conditioner compressor (press **AC** button).
- LED in button should not light up.
- Run engine for 3 minutes at 2000 rpm.
- Allow engine to run at idling speed until both large coolant hoses at radiator become warm.
- Run engine for 2 minutes at 2000 rpm.
- Switch off ignition and allow engine to cool down.
- Install engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#) .
- Check coolant level.
- The coolant level must be at the MAX marking when the engine is cold.
- The coolant level can be above the MAX marking when the engine is warm.

## Tightening torques

- ◆ ⇒ ["4.1 Exploded view - radiators/radiator fans", page 222](#)
- ◆ ⇒ ["1.1 Exploded view - supercharger", page 239](#)
- ◆ Plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Exploded view - plenum chamber partition panel
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation



## 2 Coolant pump/thermostat assembly

⇒ ["2.1 Exploded view - coolant pump/thermostat", page 191](#)

⇒ ["2.2 Exploded view - electric coolant pump", page 194](#)

⇒ ["2.3 Exploded view - coolant temperature senders", page 195](#)

⇒ ["2.4 Removing and installing electric coolant pump", page 195](#)

⇒ ["2.5 Removing and installing coolant pump", page 198](#)

⇒ ["2.6 Removing and installing thermostat", page 200](#)

⇒ ["2.7 Removing and installing coolant temperature sender G62", page 201](#)

⇒ ["2.8 Removing and installing temperature sender for engine temperature regulation G694", page 202](#)

⇒ ["2.9 Removing and installing coolant valves", page 203](#)

### 2.1 Exploded view - coolant pump/thermostat

Coolant pump/thermostat

#### 1 - Bolt

- ☐ Not available separately; combined as a unit with -item 3-
- ☐ Tightening torque  
⇒ [Item 9 \(page 45\)](#)

#### 2 - Washer

- ☐ Not available separately; combined as a unit with -item 3-

#### 3 - Idler roller

- ☐ For poly V-belt
- ☐ Combined as a unit with -items 1 and 2-

#### 4 - Connection

- ☐ For coolant hose

#### 5 - Gasket

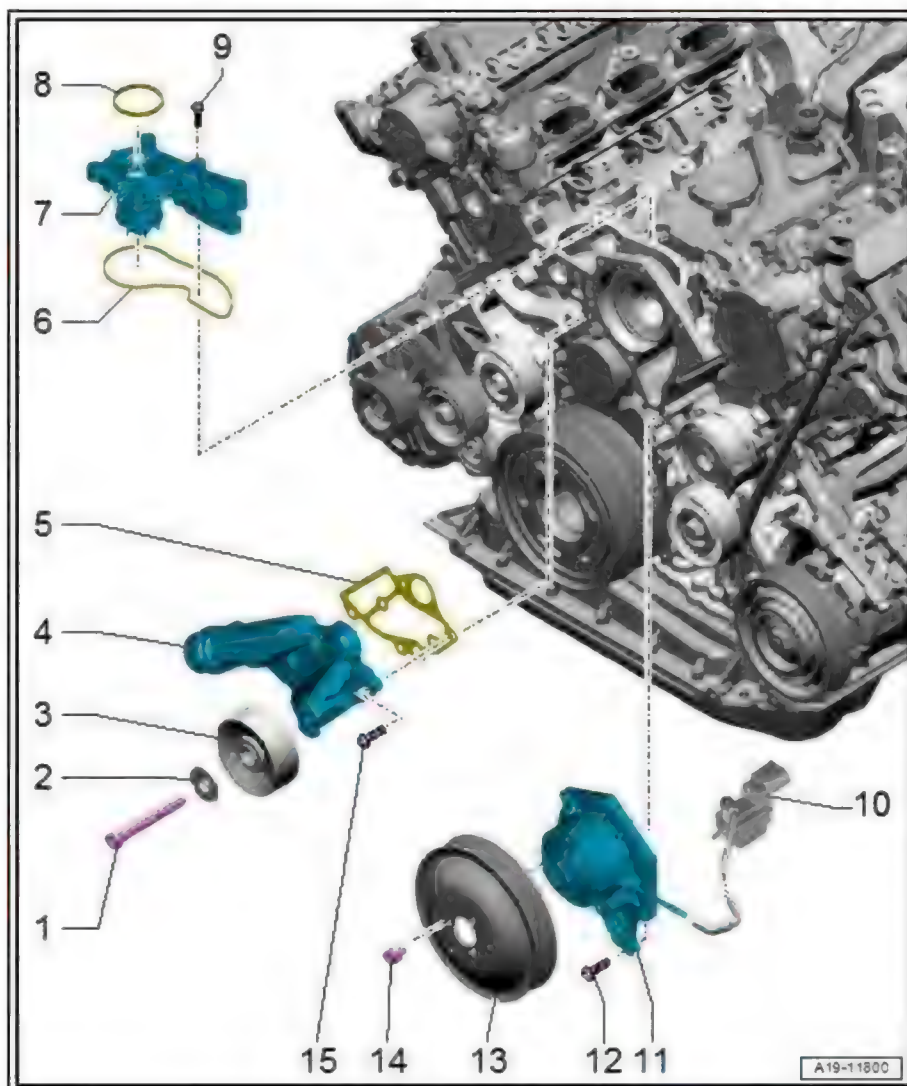
- ☐ Renew after removing

#### 6 - Seal

- ☐ Renew after removing

#### 7 - Thermostat

- ☐ Removing and installing  
⇒ ["2.6 Removing and installing thermostat", page 200](#)
- ☐ Starts to open at approx. 87°C
- ☐ Fully open at approx. 102°C
- ☐ Opening travel at least 8 mm





#### Note

*When removing and installing the thermostat, make sure that the needle is fitted correctly (conical end fitted in wax expansion element of thermostat). If necessary, push thermostat needle as far as possible into wax expansion element.*

#### 8 - Seal

- ☐ Renew after removing

#### 9 - Bolt

- ☐ 9 Nm

#### 10 - Solenoid for coolant circuit - N492-

- ☐ Fitting location ⇒ [Item 5 \(page 288\)](#)

#### 11 - Coolant pump

- ☐ With gasket
- ☐ Removing and installing ⇒ ["2.5 Removing and installing coolant pump", page 198](#)

#### 12 - Bolt

- ☐ 9 Nm

#### 13 - Poly V-belt pulley

- ☐ For coolant pump

#### 14 - Bolt

- ☐ 20 Nm

#### 15 - Bolt

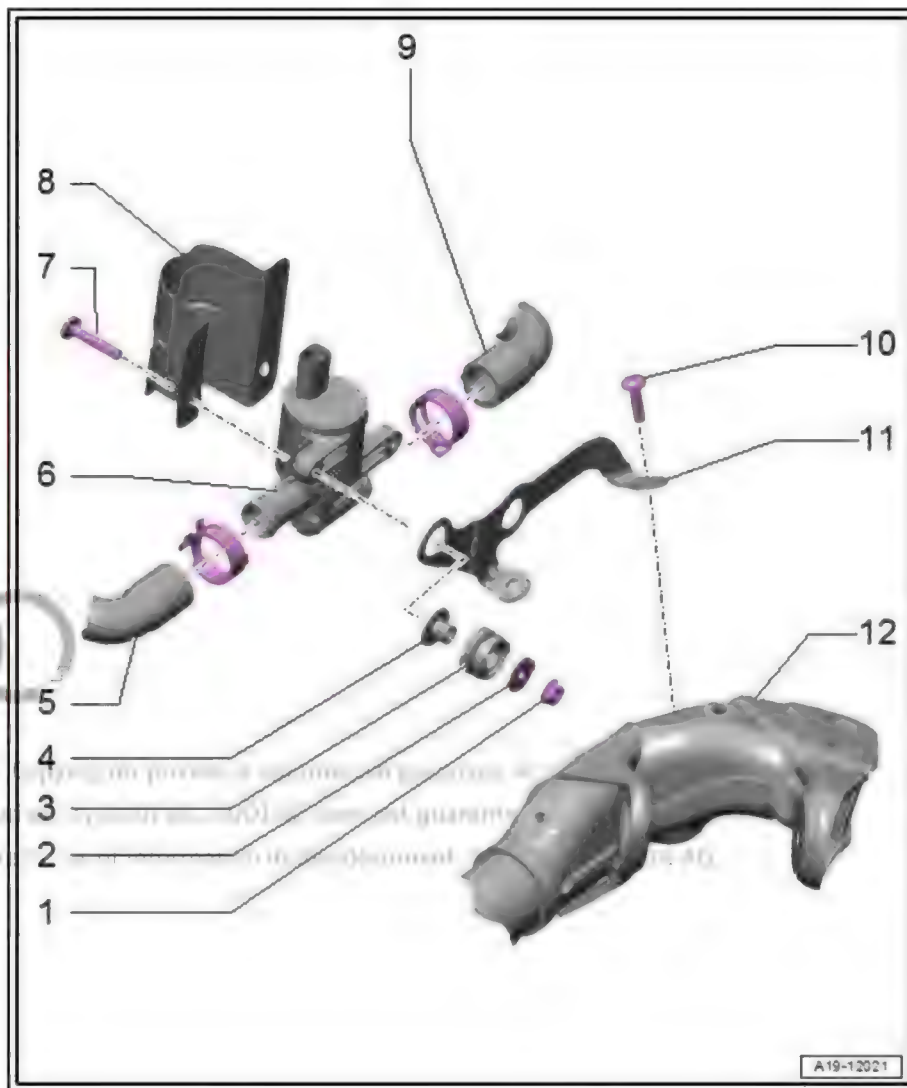
- ☐ 9 Nm

#### Coolant valve



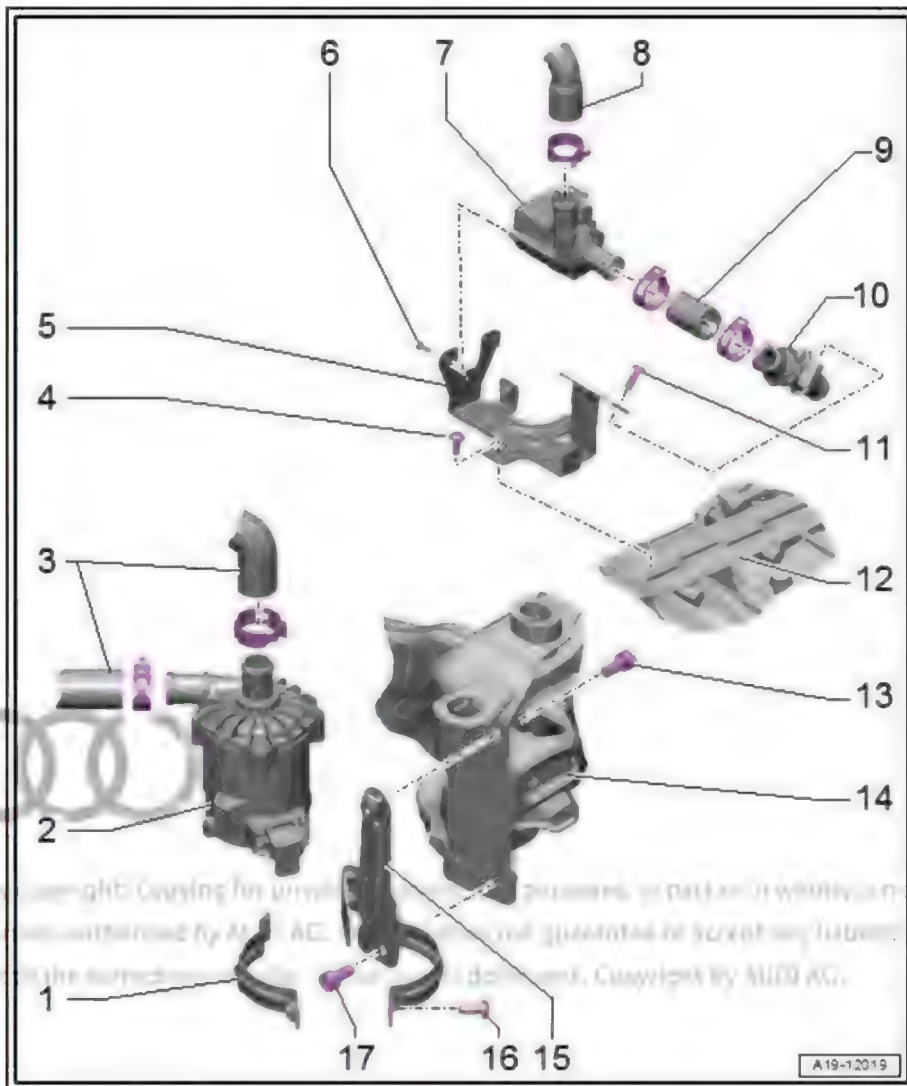
Protected by copyright. Creating for private or commercial purposes, including in whole, or in part, is prohibited unless authorized by AUDI AG. AUDI AG does not guarantee the accuracy of the information, with the exception of the guarantee of information in this document. Copyright by AUDI AG.

- 1 - Nut
- 2 - Washer
- 3 - Grommet
- 4 - Spacer sleeve
- 5 - Coolant hose
- 6 - Gearbox oil cooling valve - N509-
  - ☐ Removing and installing  
 ⇒ ["2.9 Removing and installing coolant valves", page 203](#)
- 7 - Bolt
  - ☐ 9 Nm
- 8 - Heat shield
- 9 - Coolant hose
- 10 - Bolt
  - ☐ 9 Nm
- 11 - Bracket
  - ☐ For gearbox oil cooling valve - N509-
- 12 - Subframe



## 2.2 Exploded view - electric coolant pump

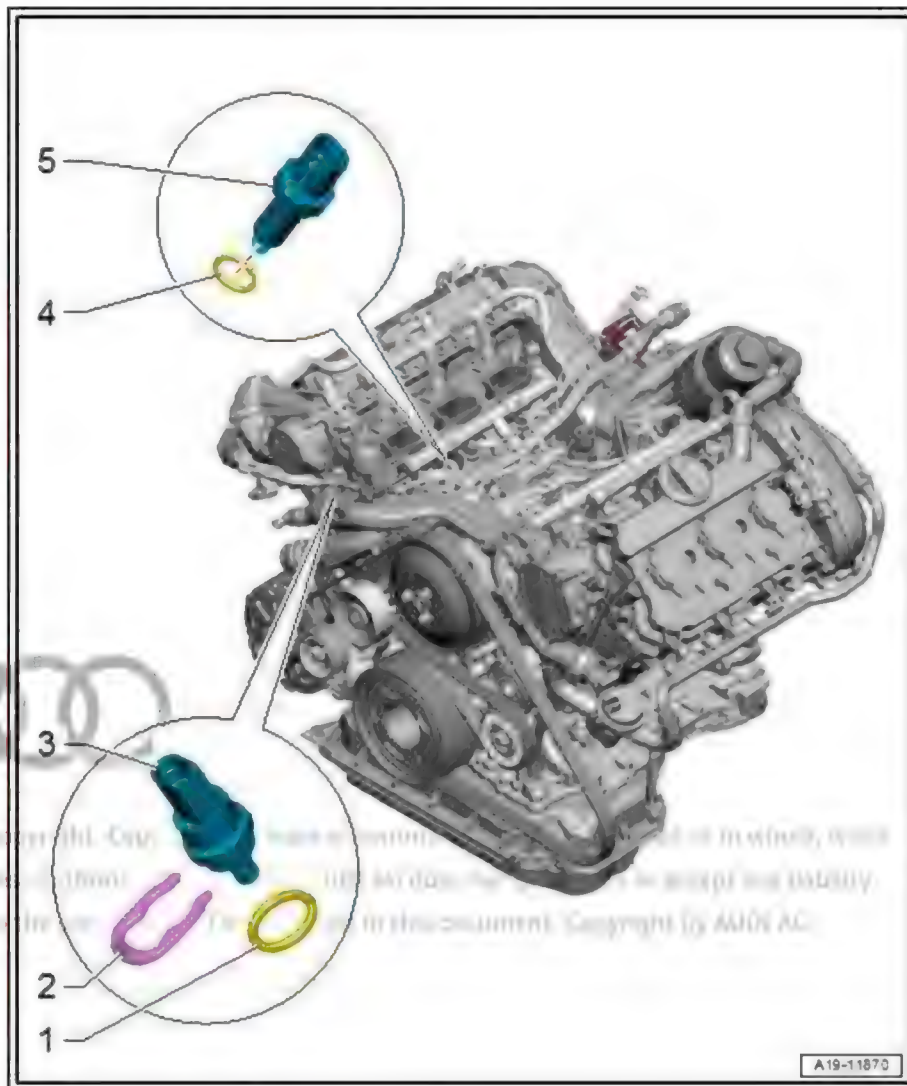
- 1 - Retaining clip
  - For charge air cooling pump - V188-
- 2 - Charge air cooling pump - V188-
  - Removing and installing  
⇒ ["2.4.2 Removing and installing charge air cooling pump V188"](#), page 197
- 3 - Coolant hoses
- 4 - Bolt
  - 9 Nm
- 5 - Bracket
  - For coolant circulation pump - V50- and coolant valve for gearbox - N488-
- 6 - Bolt
  - 1.5 Nm
- 7 - Coolant circulation pump - V50-
  - Removing and installing  
⇒ ["2.4.1 Removing and installing coolant circulation pump V50"](#), page 195
- 8 - Coolant hose
- 9 - Coolant hose
- 10 - Connection
- 11 - Bolt
  - 9 Nm
- 12 - Gearbox
- 13 - Bolt
  - 20 Nm
- 14 - Longitudinal member (left-side)
- 15 - Bracket
  - For charge air cooling pump - V188-
- 16 - Bolt
  - 9 Nm
- 17 - Bolt
  - 20 Nm



A19-12019

## 2.3 Exploded view - coolant temperature senders

- 1 - O-ring
  - ☐ Renew after removing
- 2 - Retaining clip
- 3 - Coolant temperature sender - G62-
  - ☐ Black insulation
  - ☐ Removing and installing  
⇒ ["2.7 Removing and installing coolant temperature sender G62", page 201](#)
- 4 - O-ring
  - ☐ Renew after removing
- 5 - Temperature sender for engine temperature regulation - G694-
  - ☐ Black insulation
  - ☐ Removing and installing  
⇒ ["2.8 Removing and installing temperature sender for engine temperature regulation G694", page 202](#)
  - ☐ 3 Nm



## 2.4 Removing and installing electric coolant pump

⇒ ["2.4.1 Removing and installing coolant circulation pump V50", page 195](#)

⇒ ["2.4.2 Removing and installing charge air cooling pump V188", page 197](#)

### 2.4.1 Removing and installing coolant circulation pump - V50-

Special tools and workshop equipment required

# ◆ Hose clip pliers - VAS 6340-



Protected by copyright. Copyright © 2018 Audi AG. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without prior written permission from Audi AG. Copyright © 2018 Audi AG.



## Removing

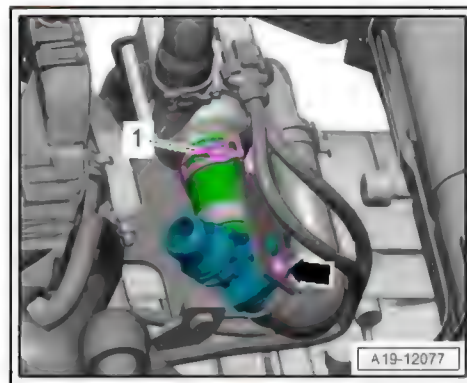
- Remove engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#) .
- Drain coolant  
⇒ ["1.3 Draining and filling cooling system", page 183](#) .
- Remove plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Exploded view - plenum chamber partition panel .
- Remove bolt -arrow-.



## Note

*Place a cloth underneath to catch escaping coolant.*

- Release hose clip -1- and disconnect coolant hose.



- Unplug electrical connector -1-.



Note

*Place a cloth underneath to catch escaping coolant.*

- Release hose clip -2- and disconnect coolant hose.
- Remove bolts -arrows- and detach coolant circulation pump - V50- .

#### Installing

Installation is carried out in reverse order; note the following:



Note

*Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*



Note

*Do not reuse coolant.*

- Fill up with coolant ⇒ [page 185](#) .

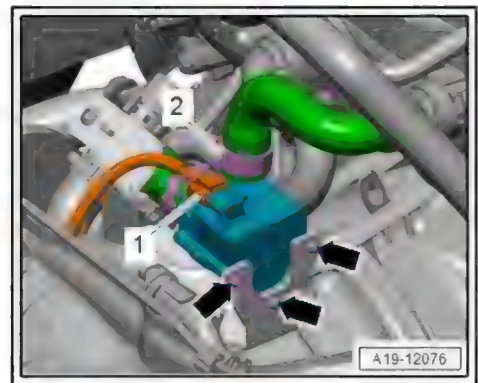
#### Tightening torques

- ◆ ⇒ [“2.2 Exploded view - electric coolant pump”, page 194](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead;  
Exploded view - plenum chamber partition panel

### 2.4.2 Removing and installing charge air cooling pump - V188-

Special tools and workshop equipment required

- ◆ Hose clamps, up to 25 mm - 3094-



Produced by AUDI AG. Covered for removal of components and installation of components. The information is provided for informational purposes only. AUDI AG does not accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ Hose clip pliers - VAS 6362-



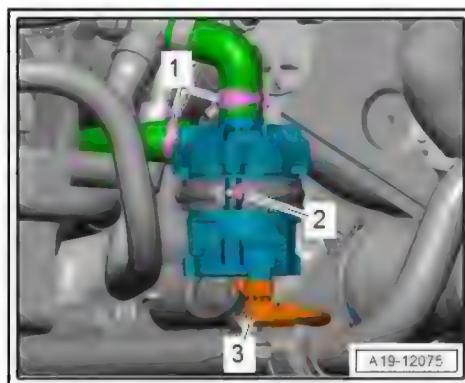
### Removing

- Remove wheel spoiler (front left) ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front) .
- Unplug electrical connector -3-.
- Remove nut -2- and detach retaining clip.



### Note

Place a cloth underneath to catch escaping coolant.



- Use hose clamps up to 25 mm - 3094- to clamp off coolant hoses at charge air cooling pump - V188- .
- Detach charge air cooling pump, then release hose clips -1- and disconnect coolant hoses.

### Installing

Installation is carried out in reverse order; note the following:



### Note

- ◆ Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- ◆ Do not reuse coolant.
- Fill up with coolant ⇒ [page 185](#) .

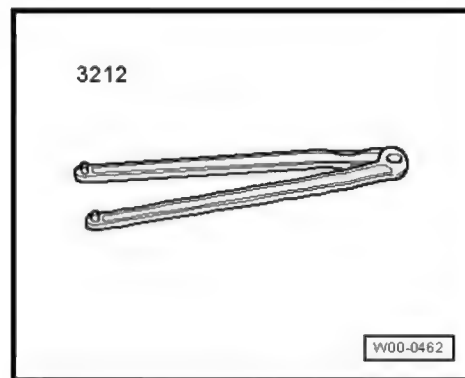
### Tightening torques

- ◆ ⇒ ["2.2 Exploded view - electric coolant pump", page 194](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front)

## 2.5 Removing and installing coolant pump

Special tools and workshop equipment required

◆ Pin wrench - 3212-



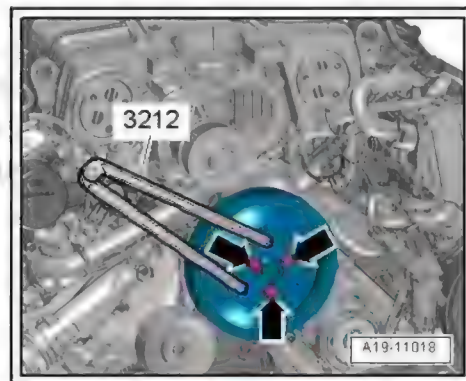
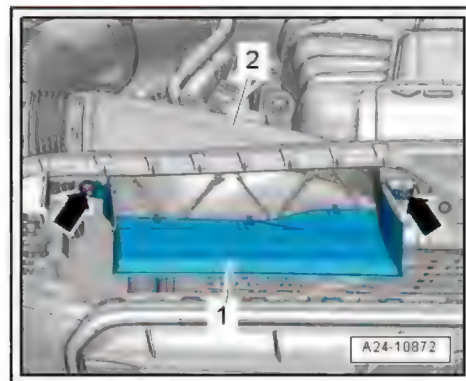
Removing

- Drain coolant  
⇒ ["1.3 Draining and filling cooling system", page 183](#) .
- Remove poly V-belt for supercharger  
⇒ ["1.2.1 Removing and installing poly V-belt for supercharger", page 47](#) .
- Remove poly V-belt from coolant pump pulley  
⇒ ["1.2.2 Removing and installing poly V-belt for ancillaries", page 48](#) .
- Remove lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing attachments .
- Remove bolts -arrows- and detach air duct -1- from lock carrier.



Note

Disregard -item 2-.



- Loosen bolts -arrows- for coolant pump pulley (counterhold with pin wrench - 3212- ).

- Remove bolts and take off poly V-belt pulley.

Protected by copyright. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without prior written permission from Audi AG. Audi AG does not guarantee the accuracy of the information in this document. Copyright by Audi AG.

- Disconnect vacuum hose -1-.



#### Note

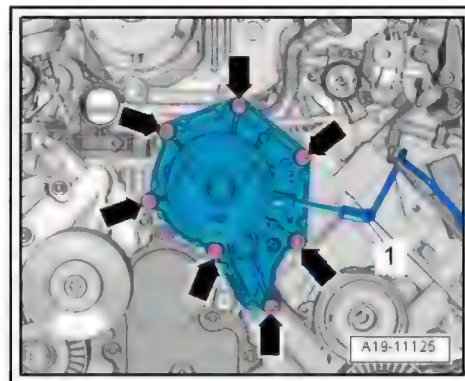
Place a cloth underneath to catch escaping coolant.

- Remove bolts -arrows- and detach coolant pump.

#### Installing

Installation is carried out in reverse order; note the following:

- Clean surfaces; they must be free of oil and grease.
- Install lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing attachments .
- Install poly V-belt  
⇒ ["1.2.2 Removing and installing poly V-belt for ancillaries", page 48](#) .



#### Note

Do not reuse coolant.

- Fill up with coolant ⇒ [page 185](#) .

#### Tightening torques

- ♦ ⇒ ["2.1 Exploded view - coolant pump/thermostat", page 191](#)
- ♦ ⇒ ["3.1 Exploded view - air cleaner housing", page 292](#)

## 2.6 Removing and installing thermostat

### Removing

- Remove coolant pipe (front right)  
⇒ ["3.2.3 Removing and installing coolant pipe \(front right\)", page 211](#) .



#### Note

*Place a cloth underneath to catch escaping coolant.*

- Remove bolts -arrows-.
- Detach coolant thermostat with hose connection.

#### Installing

Installation is carried out in reverse order; note the following:



#### Note

*When removing and installing the thermostat, make sure that the needle is fitted correctly (conical end fitted in wax expansion element of thermostat). If necessary, push thermostat needle as far as possible into wax expansion element.*



#### Note

*Renew gasket after removing.*

- Install coolant pipe (front right)  
⇒ [“3.2.3 Removing and installing coolant pipe \(front right\)”, page 211](#).

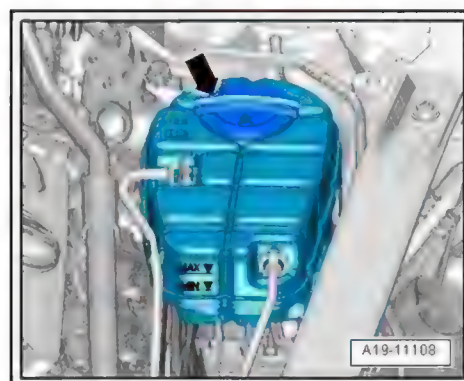
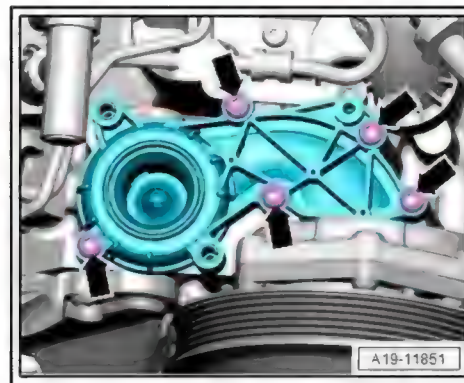
#### Tightening torques

- ◆ ⇒ [“2.1 Exploded view - coolant pump/thermostat”, page 191](#)

## 2.7 Removing and installing coolant temperature sender - G62-

### Removing

- Engine cold.
- Remove engine cover panel  
⇒ [“3.1 Removing and installing engine cover panel”, page 43](#).
- To relieve residual pressure in cooling system, open filler cap -arrow- on coolant expansion tank briefly and then close cap again (it should click into place).



- Unplug electrical connector -2-.



#### Note

Place a cloth underneath to catch escaping coolant.

- Pull off retaining clip -1- and detach coolant temperature sender - G62- .

#### Installing

Installation is carried out in reverse order; note the following:



#### Note

- ◆ Renew O-ring after removal.
- ◆ To avoid loss of coolant, insert new coolant temperature sender - G62- immediately in coolant pipe (front).
- Check coolant level ➔ [page 185](#) .
- Install engine cover panel  
➔ ["3.1 Removing and installing engine cover panel"](#),  
[page 43](#) .

## 2.8 Removing and installing temperature sender for engine temperature regulation - G694-

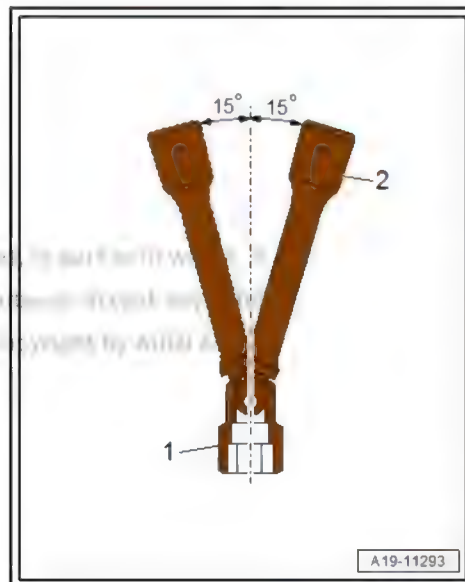
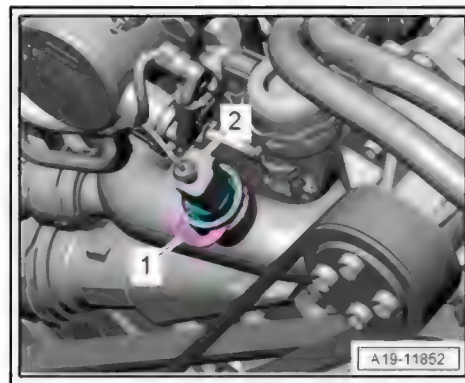
Special tools and workshop equipment required

- ◆ Twelve-point socket with jointed extension (15 mm, commercially available)



#### Note

To avoid having to remove the fuel rail, use a twelve-point socket (15 mm) -item 1- with jointed extension -2- to unscrew the sender.



## Removing

- Remove supercharger  
 ⇒ ["1.4 Removing and installing supercharger", page 244](#) .
- Unplug electrical connector -2-.
- Unscrew temperature sender for engine temperature regulation - G694- -item 1-

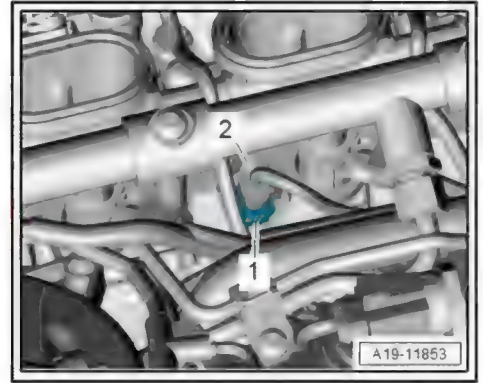
## Installing

Installation is carried out in reverse order; note the following:

- Install supercharger  
 ⇒ ["1.4 Removing and installing supercharger", page 244](#) .

## Tightening torques

- ◆ ⇒ ["2.3 Exploded view - coolant temperature senders", page 195](#)



## 2.9 Removing and installing coolant valves

Special tools and workshop equipment required

- ◆ Hose clamps, up to 25 mm - 3094-



- ◆ Hose clip pliers - VAS 6340-



## Removing

- Remove noise insulation (rear) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .

Produced by copyright. Copyright for private or company (business) use only. All rights reserved.  
 permitted (notwithstanding) by Audi AG. Audi AG reserves all rights. Copyright for private  
 use only. All rights reserved. Information in this document. Copyright by Audi AG.

- Remove bolts -arrows- and detach heat shield -3-.
- Unplug electrical connector -1-.
- Clamp off coolant hoses using hose clamps -3094- , release hose clips -2- and disconnect coolant hoses.
- Detach gearbox oil cooling valve - N509- .

#### Installing

Installation is carried out in reverse order; note the following:



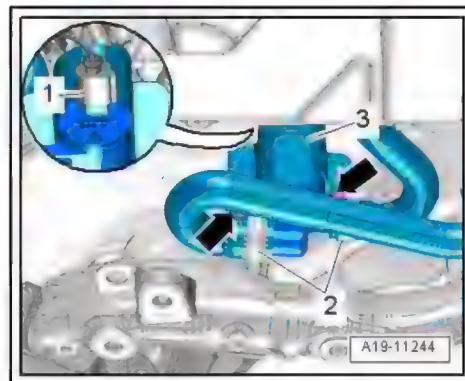
#### Note

- ◆ *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*
- ◆ *Do not reuse coolant.*
- Fill up with coolant ⇒ [page 185](#) .

#### Tightening torques

- ◆ ⇒ ["2.1 Exploded view - coolant pump/thermostat", page 191](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

Protected by copyright. Copying for private or commercial purposes, or public use, is not permitted unless authorised by AUDI AG. AUDI AG does not warrant or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



### 3 Coolant pipes

⇒ ["3.1 Exploded view - coolant pipes", page 205](#)

⇒ ["3.2 Removing and installing coolant pipes", page 208](#)

#### 3.1 Exploded view - coolant pipes

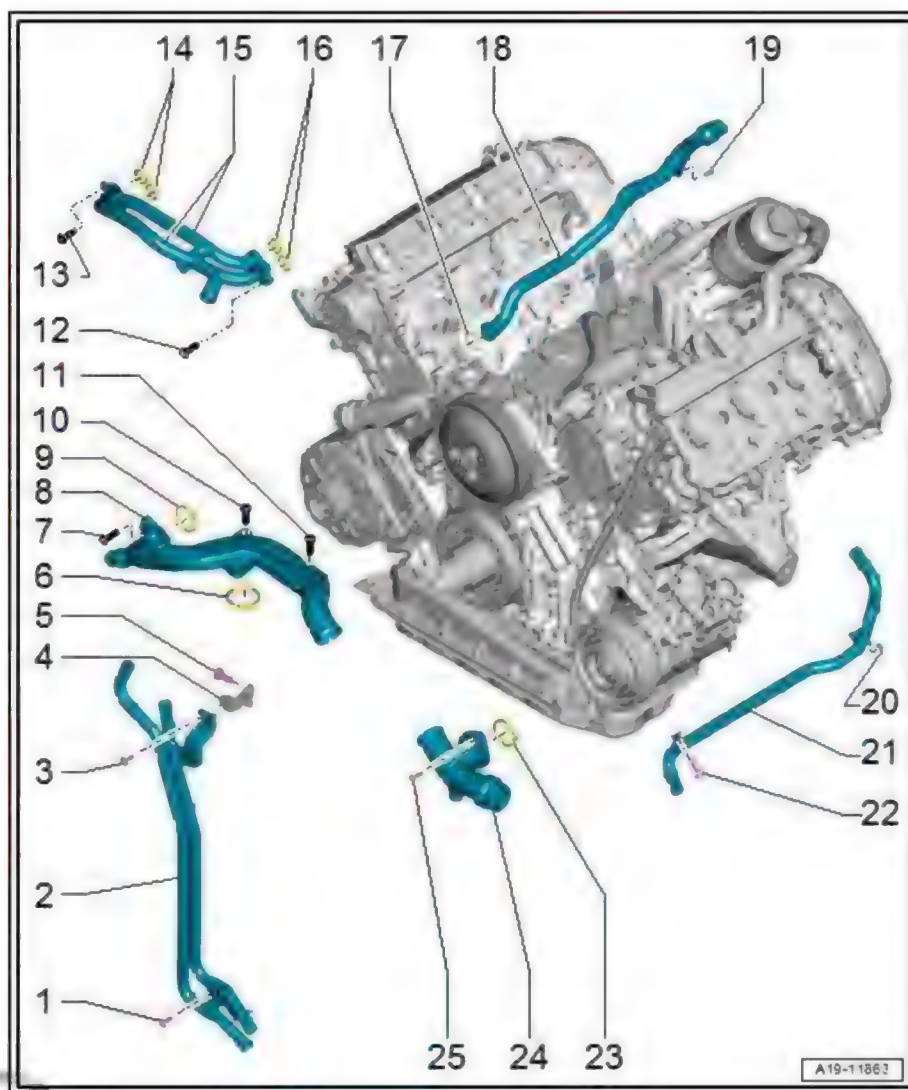


Note

*The arrow markings on coolant pipes and on ends of hoses must align.*

Coolant pipes on engine

- 1 - Bolt  
☐ 9 Nm
- 2 - Coolant pipes (front left)  
☐ Removing and installing  
⇒ ["3.2.2 Removing and installing coolant pipes \(front left\)", page 209](#)
- 3 - Bolt  
☐ 9 Nm
- 4 - Bracket
- 5 - Bolt  
☐ 22 Nm
- 6 - Seal  
☐ Renew after removing
- 7 - Bolt  
☐ 9 Nm
- 8 - Coolant pipe (front right)  
☐ Removing and installing  
⇒ ["3.2.3 Removing and installing coolant pipe \(front right\)", page 211](#)
- 9 - Seal  
☐ Renew after removing
- 10 - Bolt  
☐ 9 Nm
- 11 - Bolt  
☐ 9 Nm
- 12 - Bolt  
☐ 5 Nm
- 13 - Bolt  
☐ 5 Nm
- 14 - Seals  
☐ Renew after removing
- 15 - Coolant pipes on supercharger  
☐ Removing and installing ⇒ ["3.2.6 Removing and installing coolant pipes on supercharger", page 217](#)





16 - Seals

- ☐ Renew after removing

17 - Seal

- ☐ Renew after removing

18 - Coolant pipe (top)

- ☐ Removing and installing ⇒ [“3.2.5 Removing and installing coolant pipe \(top\)”, page 216](#)

19 - Bolt

- ☐ 9 Nm

20 - Bolt

- ☐ 9 Nm

21 - Coolant pipe (left-side)

- ☐ Removing and installing ⇒ [“3.2.4 Removing and installing coolant pipe \(left-side\)”, page 213](#)

22 - Bolt

- ☐ 9 Nm

23 - Seal

- ☐ Renew after removing

24 - Coolant pipe (front left)

- ☐ Removing and installing ⇒ [“3.2.1 Removing and installing coolant pipe \(front left\)”, page 208](#)

25 - Bolt

- ☐ 9 Nm

Coolant pipes on gearbox



Printed from copyright. Allowed for private commercial purposes, in part or in whole, if not permitted by copyright. Audi AG, Audi AG does not guarantee or accept responsibility with regard to the correctness of information in this document. Copyright by Audi AG.

1 - Gearbox

2 - Bolt

□ 9 Nm

3 - Coolant pipe (right-side) on gearbox

□ Removing and installing  
⇒ ["3.2.8 Removing and installing coolant pipe \(right-side\) on gearbox", page 220](#)

4 - Bolt

□ 9 Nm

5 - Bolt

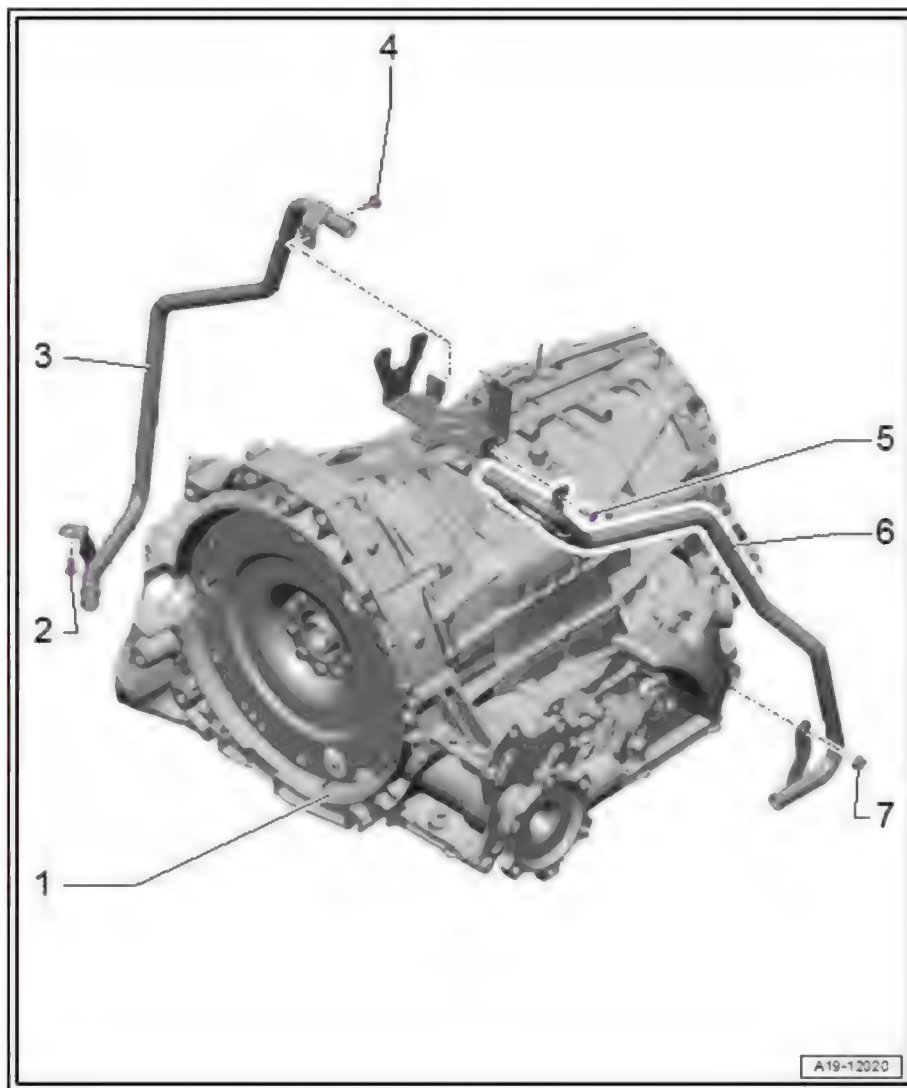
□ 9 Nm

6 - Coolant pipe (left-side) on gearbox

□ Removing and installing  
⇒ ["3.2.7 Removing and installing coolant pipe \(left-side\) on gearbox", page 219](#)

7 - Nut

□ 9 Nm



Protected by copyright. Copied for private commercial purposes, or for internal use, is permitted unless authorized by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

## 3.2 Removing and installing coolant pipes

⇒ ["3.2.1 Removing and installing coolant pipe \(front left\)", page 208](#)

⇒ ["3.2.2 Removing and installing coolant pipes \(front left\)", page 209](#)

⇒ ["3.2.3 Removing and installing coolant pipe \(front right\)", page 211](#)

⇒ ["3.2.4 Removing and installing coolant pipe \(left-side\)", page 213](#)

⇒ ["3.2.5 Removing and installing coolant pipe \(top\)", page 216](#)

⇒ ["3.2.6 Removing and installing coolant pipes on supercharger", page 217](#)

⇒ ["3.2.7 Removing and installing coolant pipe \(left-side\) on gearbox", page 219](#)

⇒ ["3.2.8 Removing and installing coolant pipe \(right-side\) on gearbox", page 220](#)

### 3.2.1 Removing and installing coolant pipe (front left)

Special tools and workshop equipment required

- ◆ Hose clip pliers - VAS 6340-



#### Removing



#### WARNING

*Risk of injury as the radiator fans may start up automatically.*

- ◆ *Even when the ignition is switched off, the radiator fans can start up without warning due to accumulated heat in the engine compartment, etc.*

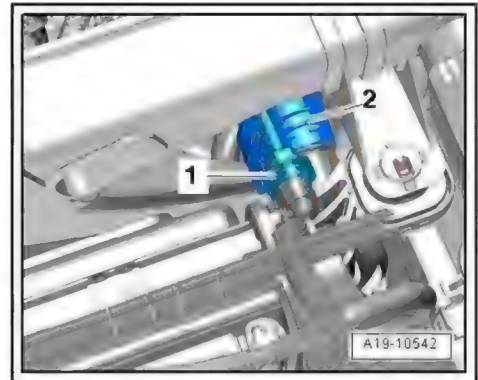
- Drain coolant  
⇒ ["1.3 Draining and filling cooling system", page 183](#) .
- Remove coolant pipes (front left)  
⇒ ["3.2.2 Removing and installing coolant pipes \(front left\)", page 209](#) .

- Lift retaining clip -2- and detach connection (top left) from radiator.



Note

*Disregard -item 1-.*



- Move clear vacuum hose -2-.
- Lift retaining clip -3- and remove coolant hose.
- Remove bolts -arrows-, release hose clips -1, 4- and detach coolant pipe (front left).

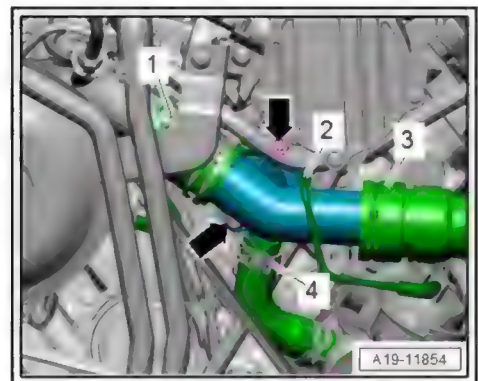
#### Installing

Installation is carried out in reverse order; note the following:



Note

- ◆ *Renew gasket after removing.*
- ◆ *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*
- Install coolant pipes (front left)  
⇒ ["3.2.2 Removing and installing coolant pipes \(front left\)", page 209 .](#)
- Connect coolant hoses and connection with plug-in connector  
⇒ [page 223 .](#)



Note

*Do not reuse coolant.*

- Fill up with coolant ⇒ [page 185 .](#)
- Install engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43 .](#)

#### Tightening torques

- ◆ ⇒ ["3.1 Exploded view - coolant pipes", page 205](#)

### 3.2.2 Removing and installing coolant pipes (front left)

Special tools and workshop equipment required

- ◆ Hose clamps, up to 25 mm - 3094-



- ◆ Drip tray for workshop hoist - VAS 6208-



- ◆ Hose clip pliers - VAS 6362-



## Removing



### WARNING

*Risk of injury as the radiator fans may start up automatically.*

- ◆ *Even when the ignition is switched off, the radiator fans can start up without warning due to accumulated heat in the engine compartment, etc.*

- Remove engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#).
- Remove noise insulation (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .

Protected by copyright. Copying for private or commercial purposes is prohibited without the written permission of Audi AG. Audi AG does not guarantee or accept any liability for the correctness of the information in this document. Copyright by Audi AG.



## WARNING

*Risk of scalding due to hot steam and hot coolant.*

- ◆ *The cooling system is under pressure when the engine is hot.*
- ◆ *To allow pressure to dissipate, cover filler cap on coolant expansion tank with cloth and open carefully.*

- Open filler cap -arrow- on coolant expansion tank.
- Place drip tray for workshop hoist - VAS 6208- underneath.



## Note

*For illustration purposes, the installation position is shown in the following illustrations with the engine removed.*

- Clamp off coolant hoses using hose clamps, up to 25 mm - 3094- , release hose clips -2- and disconnect coolant hoses from coolant pipes (front left).
- Remove bolt -1-.
- Release hose clips -1- and detach coolant hoses from coolant pipes at supercharger.
- Remove bolt -2-.
- Detach coolant pipes (front left) from below.

## Installing

Installation is carried out in reverse order; note the following:



## Note

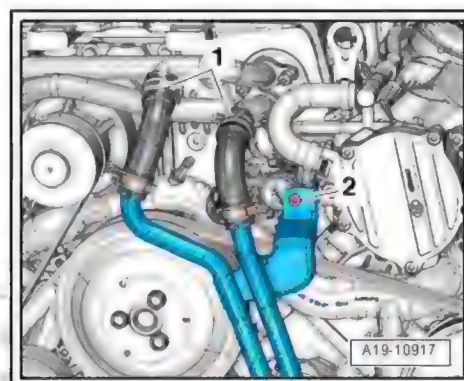
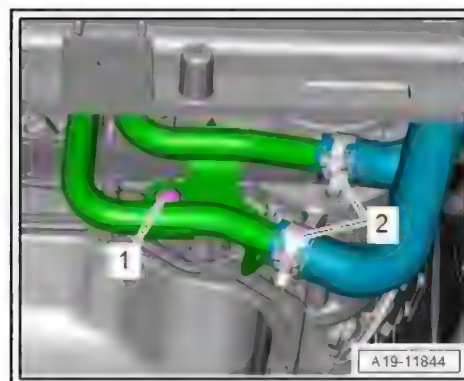
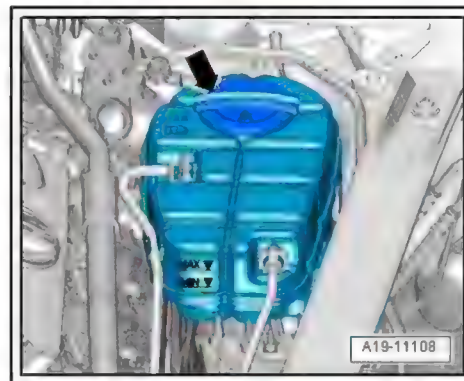
- ◆ *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*
- ◆ *Do not reuse coolant.*
- Install engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel"](#),  
[page 43](#) .
- Fill up with coolant ⇒ [page 185](#) .

## Tightening torques

- ◆ ⇒ ["3.1 Exploded view - coolant pipes"](#), [page 205](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

## 3.2.3 Removing and installing coolant pipe (front right)

Special tools and workshop equipment required



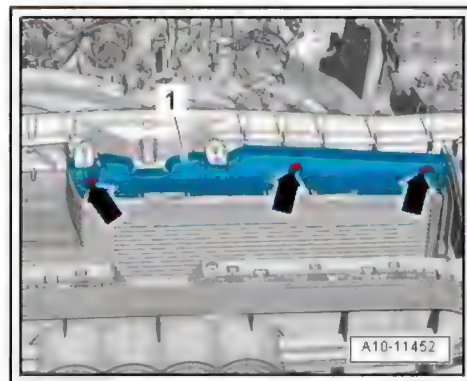


- ◆ Hose clip pliers - VAS 6362-



### Removing

- Remove supercharger  
⇒ ["1.4 Removing and installing supercharger"](#), page 244 .
- Remove coolant pipe (front left)  
⇒ ["3.2.1 Removing and installing coolant pipe \(front left\)"](#), page 208 .
- Remove lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing attachments .
- Remove bolts -arrows- and detach air duct -1-.

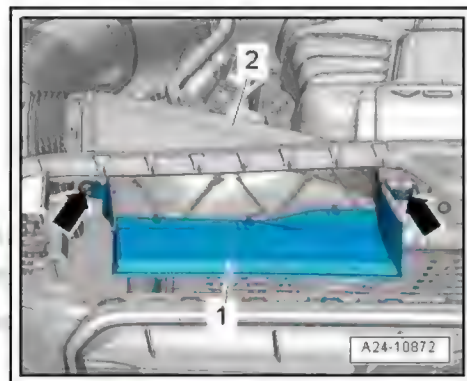


- Remove bolts -arrows- and detach air duct -2- from lock carrier.

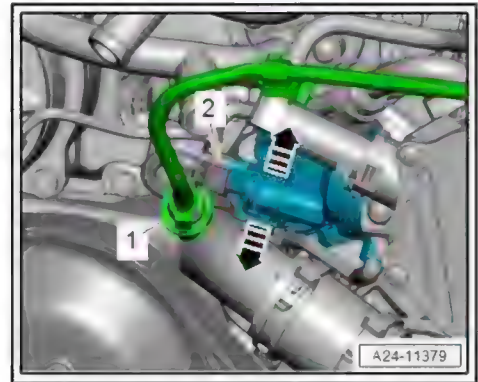


### Note

Disregard -item 1-.



- Lift retaining clip -1- and disconnect coolant line.
- Unplug electrical connector -2-.
- Release fasteners -arrows- and detach intake manifold flap potentiometer - G336- .



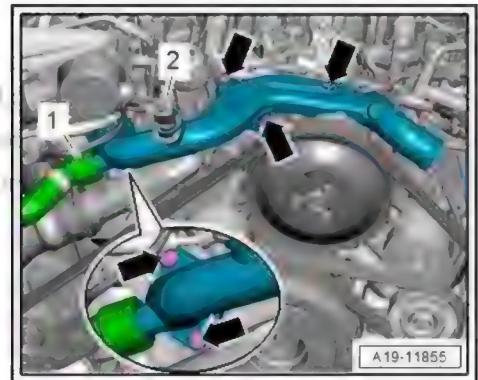
- Unplug electrical connector -2-.
- Lift retaining clip -1- and disconnect coolant hose.
- Unscrew bolts -arrows- and remove coolant pipe (front right).

#### Installing

Installation is carried out in reverse order; note the following:

#### Note

- ◆ *Renew seals after removing.*
- ◆ *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*



- Connect coolant line and coolant hose with plug-in connector ⇒ [page 223](#) .
- Install lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing attachments .
- Install coolant pipe (front left)  
⇒ ["3.2.1 Removing and installing coolant pipe \(front left\)", page 208](#) .
- Install supercharger  
⇒ ["1.4 Removing and installing supercharger", page 244](#) .

#### Note

*Do not reuse coolant.*

- Fill up with coolant ⇒ [page 185](#) .

#### Tightening torques

- ◆ ⇒ ["3.1 Exploded view - coolant pipes", page 205](#)
- ◆ ⇒ ["3.1 Exploded view - air cleaner housing", page 292](#)

### 3.2.4 Removing and installing coolant pipe (left-side)

Special tools and workshop equipment required



- ◆ Hose clip pliers - VAS 6362-



### Removing

- Drain coolant  
⇒ ["1.3 Draining and filling cooling system", page 183](#) .
- Remove body brace ⇒ Running gear, axles, steering; Rep. gr. 40 ; Suspension strut, upper links; Removing and installing body brace .
- Unscrew bolts -arrows- and pull filler neck -1- out of washer fluid reservoir and through opening in body to right side.

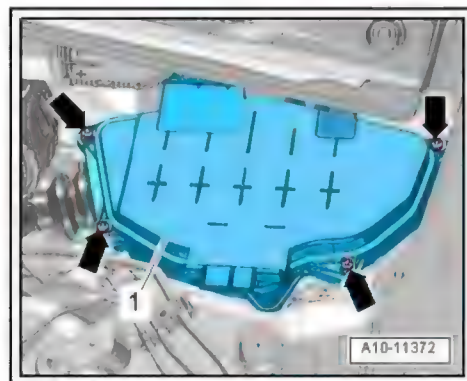
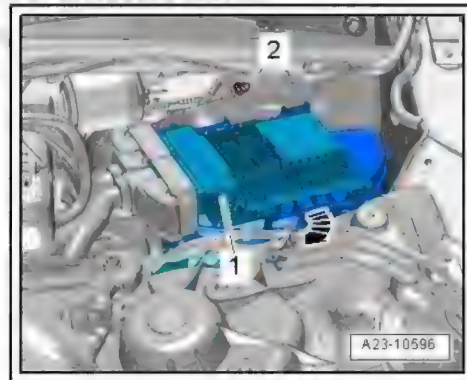
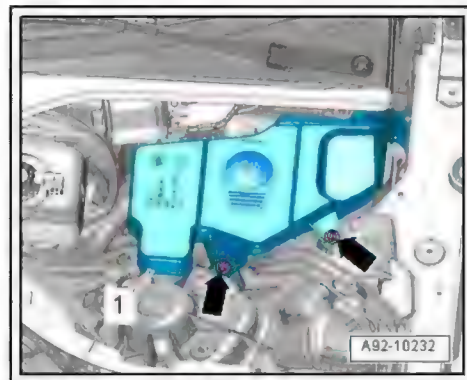


Imported by Audi AG. Copying for private or commercial purposes

permitted unless authorised by AUDI AG. AUDI AG does not guarantee

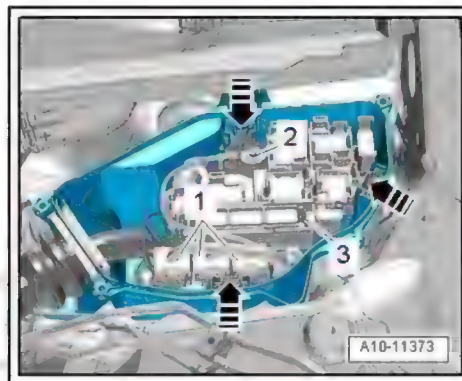
with respect to the correctness of information in this document.

- Remove cap nut -2- and move earth wiring clear.
- Release fastener -arrow-, detach engine control unit - J623-  
-item 1- from bracket and swivel it to one side.
- Remove bolts -arrows- and detach cover -1- for electronics  
box in plenum chamber.

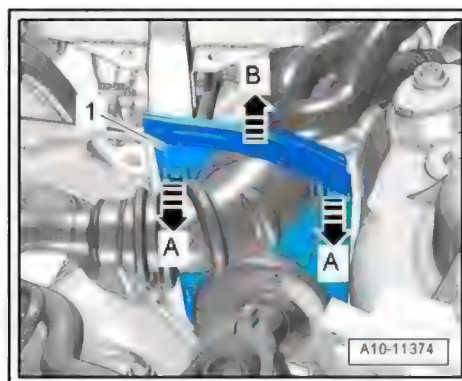


- Unplug electrical connectors -1- and unscrew nut -2- for electrical wiring.
- Release catches -arrows- and detach relay carrier with fuse holder -3-.
- Disengage engine wiring harness at electronics box in plenum chamber and move clear.

Protected by copyright. Copying for private use is permitted unless authorised by AUDI AG. AUDI AG does not accept any liability with respect to the correctness of information in this document.



- Release catches -arrows A- and lift off wiring protector -1- -arrow B-.
- Move clear wiring harness and press to one side.

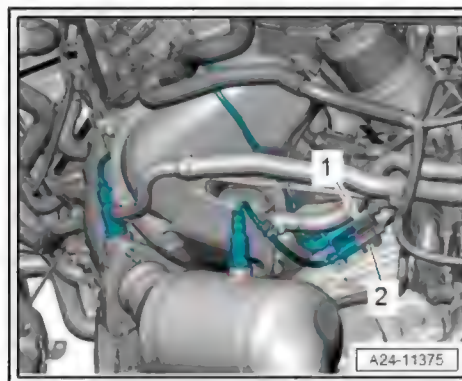


- Take electrical connector -1- for Lambda probe 2 - G108- out of bracket, unplug and move wiring clear.

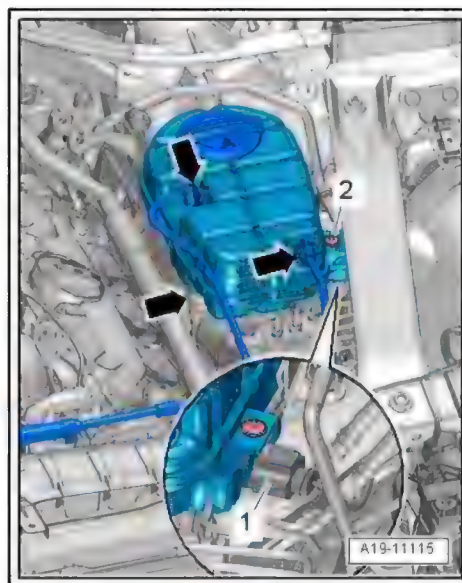


Note

*Disregard -item 2-.*



- Unplug electrical connector -1-.
- Remove bolt -2-.
- Lift retaining clips -arrows- and disconnect coolant hoses from coolant expansion tank.



- Move electrical wiring harness clear.
- Release hose clips -arrows- and detach coolant hoses.
- Remove bolt -1- and nut -2- and detach coolant pipe (left-side) towards rear.

#### Installing

Installation is carried out in reverse order; note the following:

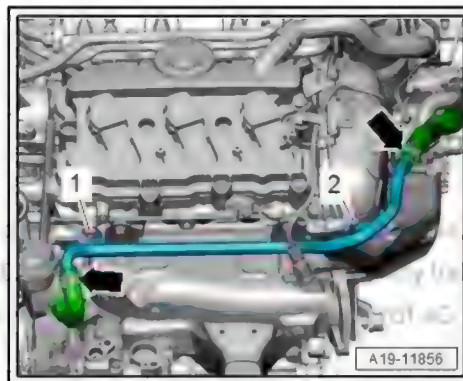


#### Note

- ◆ *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*
- ◆ *Do not reuse coolant.*
- Fill up with coolant ⇒ [page 185](#) .

#### Tightening torques

- ◆ ⇒ ["3.1 Exploded view - coolant pipes", page 205](#)
- ◆ Filler neck for washer fluid reservoir ⇒ Electrical system; Rep. gr. 92 ; Windscreen washer system; Exploded view - windscreen washer system
- ◆ Installing body brace ⇒ Running gear, axles, steering; Rep. gr. 40 ; Suspension strut, upper links; Exploded view - suspension strut, upper links



### 3.2.5 Removing and installing coolant pipe (top)

#### Removing



#### Note

*Re-install all cable ties in the same locations when installing.*

- Drain coolant  
⇒ ["1.3 Draining and filling cooling system", page 183](#) .
- Remove high-pressure pipe  
⇒ ["7.3 Removing and installing high-pressure pipe", page 326](#) .



#### Note

*Place a cloth underneath to catch escaping coolant.*

- Lift retaining clip -2- and disconnect coolant hose from coolant pipe.
- Remove bolt -1- and pull coolant pipe rearwards out of cylinder block -arrow-.

#### Installing

Installation is carried out in reverse order; note the following:



#### Note

*Renew O-ring after removal.*

- Clean and smoothen sealing surface for O-ring.
- Lubricate O-ring with coolant and slide onto coolant pipe.
- Connect coolant hose with plug-in connector ➔ [page 223](#) .
- Install high-pressure pipe  
➔ ["7.3 Removing and installing high-pressure pipe",  
page 326](#) .



#### Note

*Do not reuse coolant.*

- Fill up with coolant ➔ [page 185](#) .

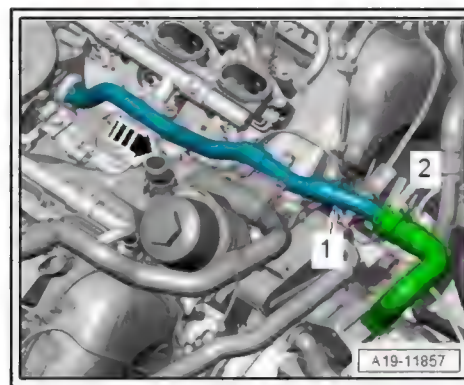
#### Tightening torques

- ◆ ➔ ["3.1 Exploded view - coolant pipes", page 205](#)

### 3.2.6 Removing and installing coolant pipes on supercharger

#### Special tools and workshop equipment required

- ◆ Hose clamps, up to 25 mm - 3094-



Printed by system. Copying for private or commercial purposes is prohibited. All rights reserved. Audi AG, Audi AG does not guarantee any liability with respect to the information provided.



- ◆ Drip tray for workshop hoist - VAS 6208-



- ◆ Hose clip pliers - VAS 6362-

Produced by copyright - Copyright für Druck und Verlag ist vorbehalten. Nachdruck, Vervielfältigung und Verbreitung, auch auszugsweise, ist ohne schriftliche Genehmigung der Audi AG. Audi ist ein eingetragenes Warenzeichen der Audi AG. Audi ist ein eingetragenes Warenzeichen der Audi AG.



#### Removing

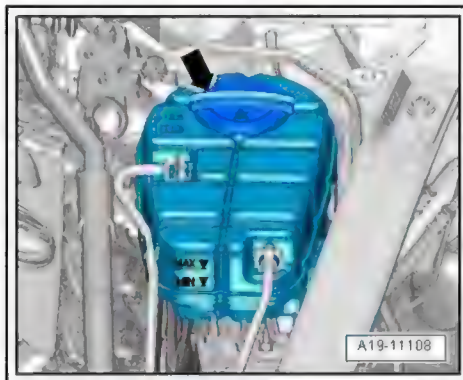
- Remove engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#).



#### WARNING

*Risk of scalding due to hot steam and hot coolant.*

- ◆ *The cooling system is under pressure when the engine is hot.*
- ◆ *To allow pressure to dissipate, cover filler cap on coolant expansion tank with cloth and open carefully.*

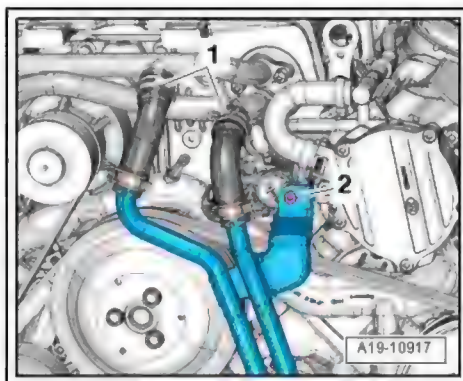


- Open filler cap -arrow- on coolant expansion tank.
- Remove noise insulation (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Place drip tray for workshop hoist - VAS 6208- underneath.
- Clamp off coolant hoses using hose clamps, up to 25 mm - 3094- , release hose clips -1- and disconnect coolant hoses from coolant pipes at supercharger.



#### Note

*Disregard -item 2-.*



- Move electrical wiring harness clear.
- Remove bolts -1 and 2- and detach coolant pipes from supercharger.

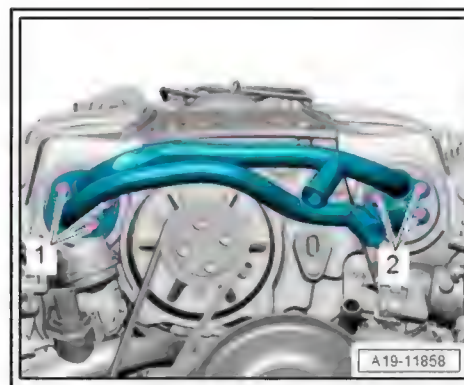
#### Installing

Installation is carried out in reverse order; note the following:



Note

- ◆ *Renew seals after removing.*
- ◆ *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*



Note

*Do not reuse coolant.*

- Fill up with coolant ⇒ [page 185](#) .

#### Tightening torques

- ◆ ⇒ ["3.1 Exploded view - coolant pipes", page 205](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

### 3.2.7 Removing and installing coolant pipe (left-side) on gearbox

Special tools and workshop equipment required

- ◆ Hose clip pliers - VAS 6340-



Protected by copyright. Tausch für private Zwecke ist zulässig. In part or in whole, if not permitted unless authorized by AUDI AG. AUDI AG does not guarantee any liability. (With regard to the technical information in this document. Copyright by AUDI AG.

## Removing

- Remove engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#) .
- Drain coolant  
⇒ ["1.3 Draining and filling cooling system", page 183](#) .
- Remove bolt -2- and nut -3-.
- Release hose clip -1- and disconnect coolant hose.
- Detach coolant pipe (left-side) at gearbox.



### Note

Disregard -item 4-.

## Installing

Installation is carried out in reverse order; note the following:



### Note

- ◆ *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ [Electronic parts catalogue](#) .*
- ◆ *Do not reuse coolant.*
- Fill up with coolant ⇒ [page 185](#) .

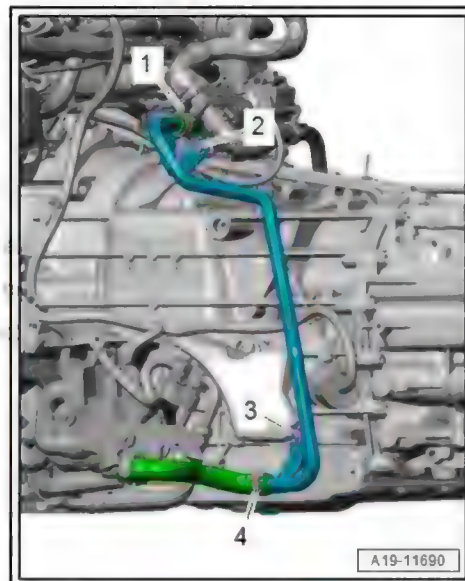
## Tightening torques

- ◆ ⇒ ["3.1 Exploded view - coolant pipes", page 205](#)

## 3.2.8 Removing and installing coolant pipe (right-side) on gearbox

Special tools and workshop equipment required

- ◆ Hose clip pliers - VAS 6340-



## Removing

- Remove engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#) .
- Drain coolant  
⇒ ["1.3 Draining and filling cooling system", page 183](#) .
- Remove plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Exploded view - plenum chamber partition panel .

- Remove bolts -arrows-.
- Release hose clips -1, 2- and disconnect coolant hoses.
- Detach coolant pipe (right-side) from gearbox.

#### Installing

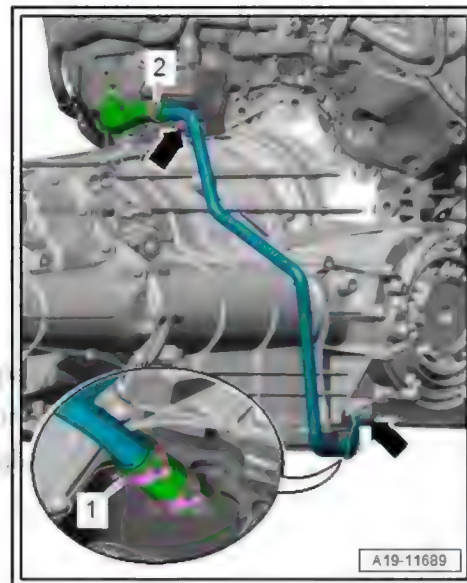
Installation is carried out in reverse order; note the following:



- ◆ *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ **Electronic parts catalogue**.*
- ◆ *Do not reuse coolant.*
- Fill up with coolant ⇒ [page 185](#).

#### Tightening torques

- ◆ ⇒ ["3.1 Exploded view - coolant pipes", page 205](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead;  
Exploded view - plenum chamber partition panel



## 4 Radiators/radiator fans

⇒ "4.1 Exploded view - radiators/radiator fans", page 222

⇒ "4.2 Exploded view - auxiliary radiator", page 225

⇒ "4.3 Removing and installing radiator", page 225

⇒ "4.4 Removing and installing water radiator for charge air cooling circuit", page 230

⇒ "4.5 Removing and installing radiator cowl", page 234

⇒ "4.6 Removing and installing radiator fan V7 ", page 236

⇒ "4.7 Removing and installing auxiliary radiator", page 236

### 4.1 Exploded view - radiators/radiator fans

#### Radiator

##### 1 - Coolant hose

- ☐ Lift retaining clip to detach
- ☐ Connecting ⇒ page 223

##### 2 - O-ring

- ☐ Renew after removing

##### 3 - Air duct

##### 4 - Coolant hose

- ☐ Lift retaining clip to detach
- ☐ Connecting ⇒ page 223

##### 5 - O-ring

- ☐ Renew after removing

##### 6 - Radiator

- ☐ Remove and install together with radiator cowl ⇒ "4.3 Removing and installing radiator", page 225
- ☐ If renewed, refill system with fresh coolant

##### 7 - O-ring

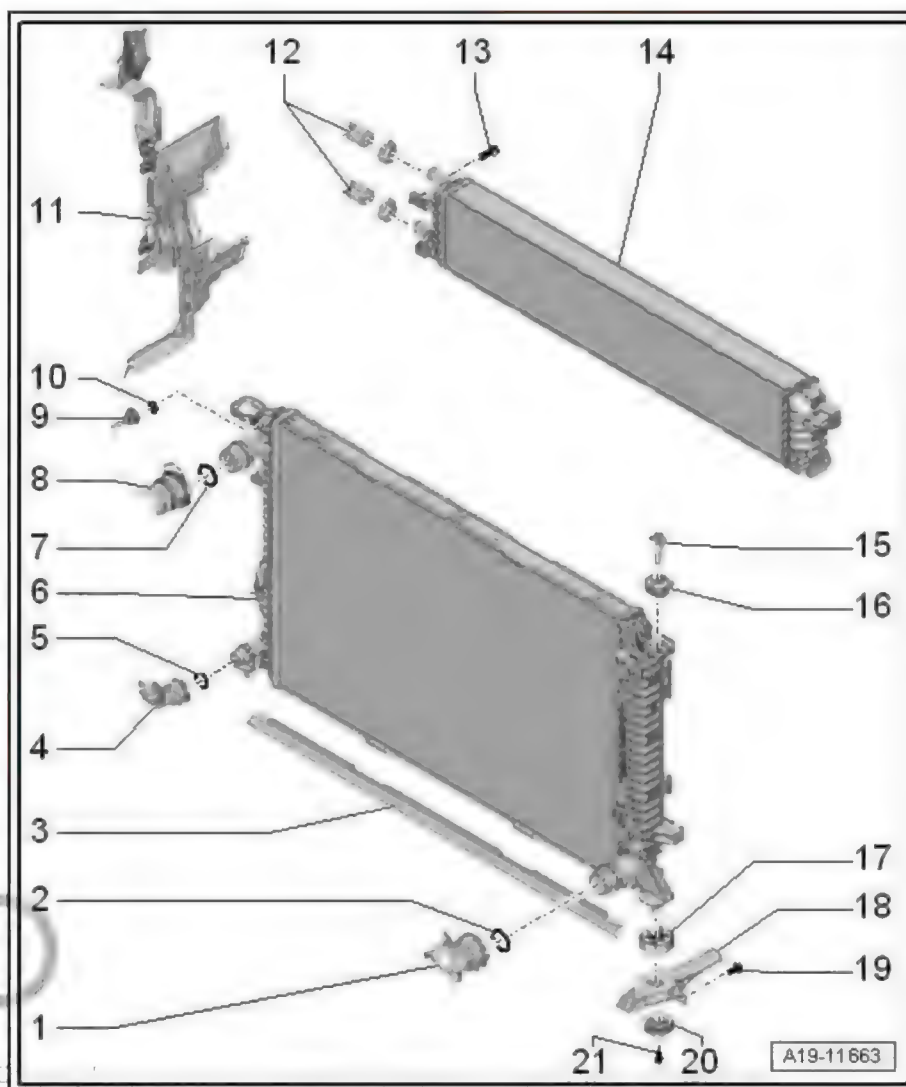
- ☐ Renew after removing

##### 8 - Coolant hose

- ☐ To coolant expansion tank
- ☐ Press release ring to detach
- ☐ Connecting ⇒ page 223

##### 9 - Coolant hose

- ☐ To coolant expansion tank
- ☐ Press release ring to detach
- ☐ Connecting ⇒ page 223



9 - Coolant hose

- ☐ To coolant expansion tank
- ☐ Press release ring to detach
- ☐ Connecting ⇒ page 223

10 - O-ring

- ☐ Renew after removing

11 - Air duct

12 - Coolant hoses

13 - Bolt

- ☐ 4.5 Nm

14 - Water radiator for charge air cooling circuit

- ☐ Removing and installing

⇒ ["4.4 Removing and installing water radiator for charge air cooling circuit", page 230](#)

15 - Retaining pin

- ☐ Use screwdriver to release and pull off

16 - Rubber mounting

- ☐ For radiator

17 - Bolt

- ☐ 5.5 Nm

18 - Radiator bracket

19 - Bolt

- ☐ 5 Nm

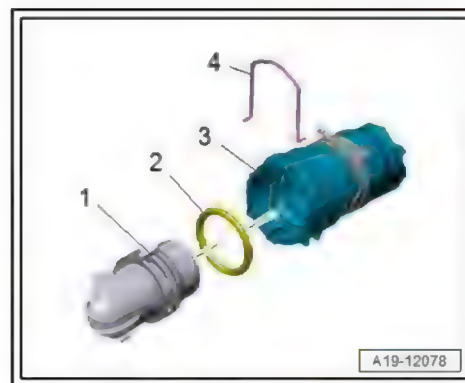
20 - Washer

21 - Bolt

- ☐ 4.5 Nm

Connecting coolant hose with plug-in connector

- If damaged, renew retaining clip -4-.
- If damaged, renew O-ring. To do so, remove O-ring -2- from plug-in connector -3- using a suitable tool (do not use a sharp tool). Take care not to damage the plug-in connector or the surface on which the O-ring is seated.
- Lightly lubricate new O-ring with coolant and fit O-ring in plug-in connector.
- Press plug-in connector onto connection -1- until it engages audibly.
- Press plug-in connector in again and then pull to check that it is correctly engaged.



Radiator cowl and radiator fans



Copyright by Audi AG. Copying for private or commercial purposes is not permitted without written permission by Audi AG. Audi AG assumes no liability for the correctness of the information in this document. Copyright by Audi AG.

# 1 - Radiator fan 2 - V177-

- ☐ With radiator fan control unit 2 - J671-
- ☐ Removing and installing  
⇒ ["4.6 Removing and installing radiator fan V7"](#),  
page 236

# 2 - Radiator fan - V7-

- ☐ With radiator fan control unit - J293-
- ☐ Removing and installing  
⇒ ["4.6 Removing and installing radiator fan V7"](#),  
page 236

# 3 - Radiator cowl

- ☐ Removing and installing  
⇒ ["4.5 Removing and installing radiator cowl"](#),  
page 234

# 4 - Bolt

- ☐ 3.5 Nm

# 5 - Fan wheel

- ☐ Pin must engage in hole

# 6 - Bolt

- ☐ 5 Nm

# 7 - Fan wheel

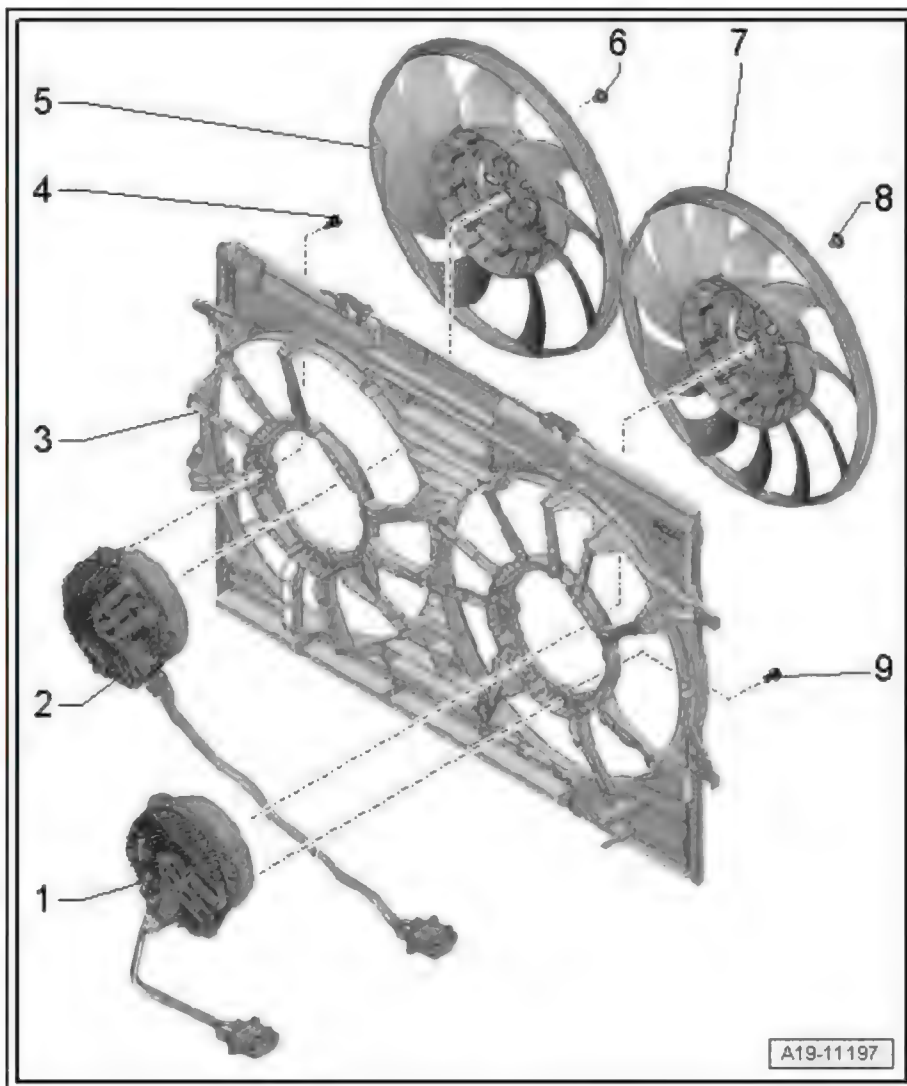
- ☐ Pin must engage in hole

# 8 - Bolt

- ☐ 5 Nm

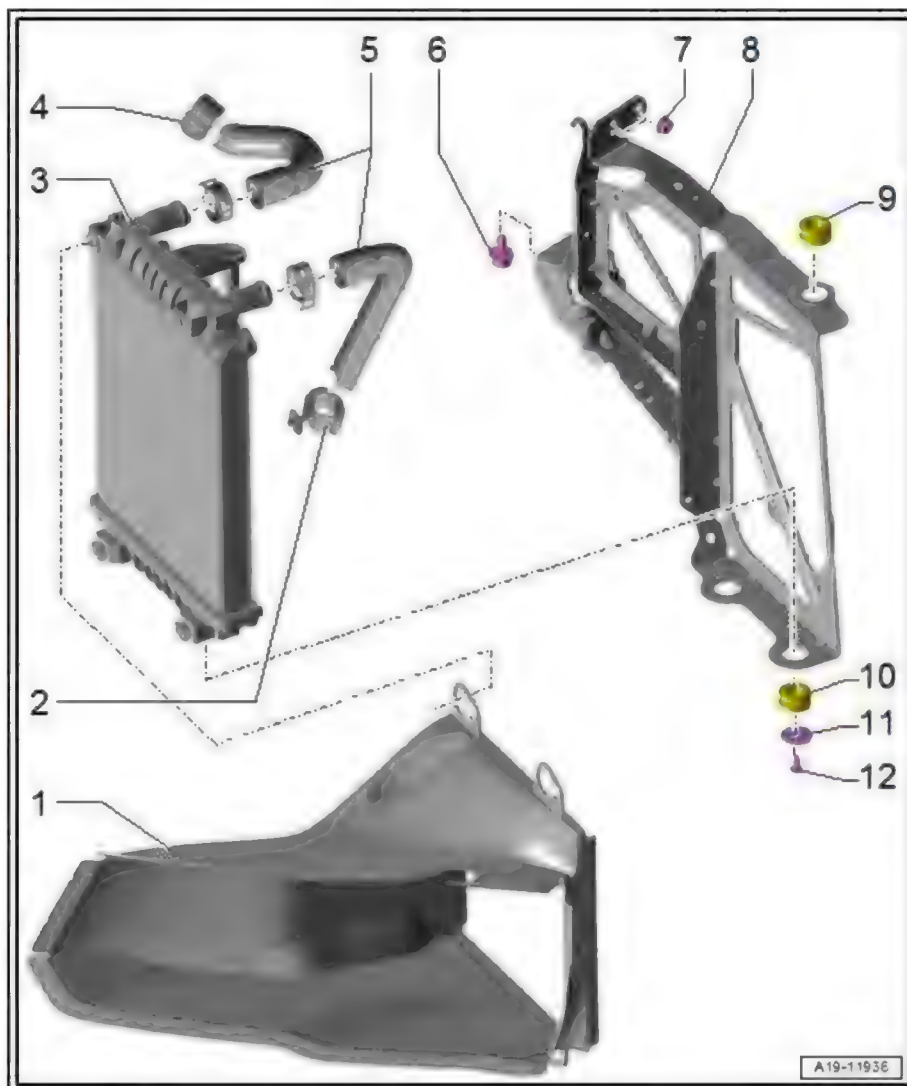
# 9 - Bolt

- ☐ 3.5 Nm



## 4.2 Exploded view - auxiliary radiator

- 1 - Front air duct
  - ☐ Clipped onto rear air duct
  - ☐ Move to side to unclip and remove
- 2 - Clip
- 3 - Auxiliary radiator
  - ☐ Removing and installing  
⇒ ["4.7 Removing and installing auxiliary radiator", page 236](#)
  - ☐ If renewed, change coolant in entire system
- 4 - Clip
- 5 - Coolant hoses
- 6 - Bolt
  - ☐ 20 Nm
- 7 - Nut
  - ☐ 8 Nm
- 8 - Bracket
- 9 - Rubber bush
  - ☐ For radiator
- 10 - Rubber bush
  - ☐ For radiator
- 11 - Washer
- 12 - Bolt
  - ☐ 3.5 Nm



## 4.3 Removing and installing radiator



Note

*Radiator can only be removed and installed together with radiator cowl.*

Special tools and workshop equipment required



protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorized by AUDI AG/AUDI AG/China and guarantee in all cases any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



◆ Drip tray for workshop hoist - VAS 6208-



permitted by agreement. Copying for private use is permitted, provided the source is acknowledged. All rights reserved. This document is copyrighted by Audi AG.

W00-11209



◆ Hose clip pliers - VAS 6362-



W00-11227

Removing

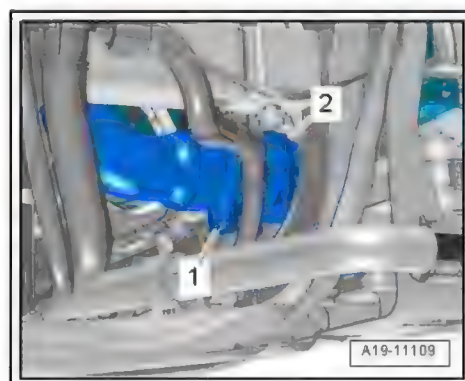


**WARNING**

*Risk of injury as the radiator fans may start up automatically.*

- ◆ *Even when the ignition is switched off, the radiator fans can start up without warning due to accumulated heat in the engine compartment, etc.*

- Remove noise insulation (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Remove impact bar ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing impact bar .
- Place drip tray for workshop hoist - VAS 6208- underneath.
- Remove drain plug -1- and drain off coolant.
- Lift retaining clip -2- and disconnect coolant hose from radiator.

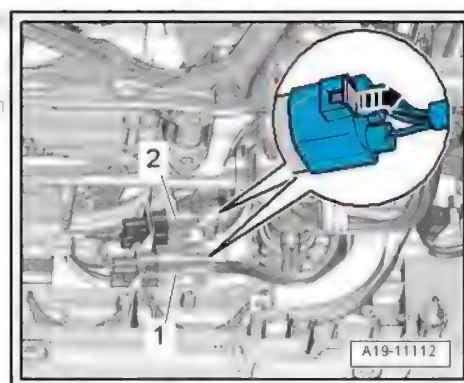
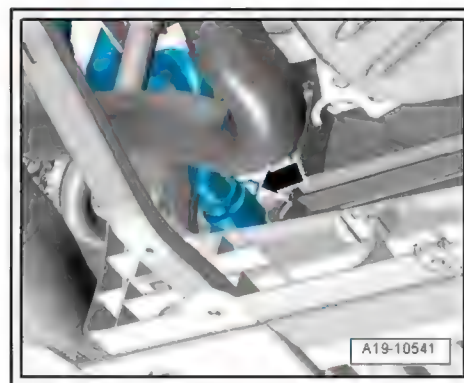


A19-11109

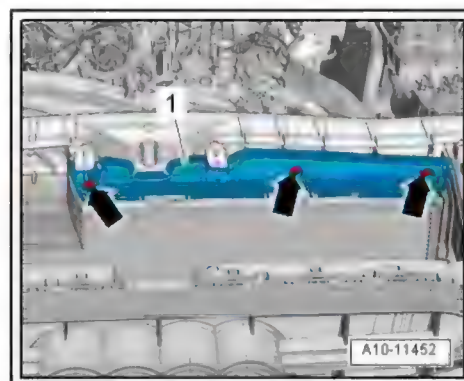
- Lift retaining clip -arrow-, detach connection from radiator and drain off coolant.



- Unplug electrical connectors -1, 2- for radiator fan (push retainer to the rear -arrow- and press down release catch).



- Remove bolts -arrows- and detach air duct -1-.

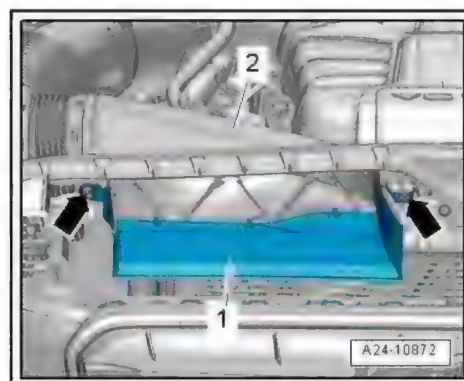


- Remove bolts -arrows- and detach air duct -1- from lock carrier.



Note

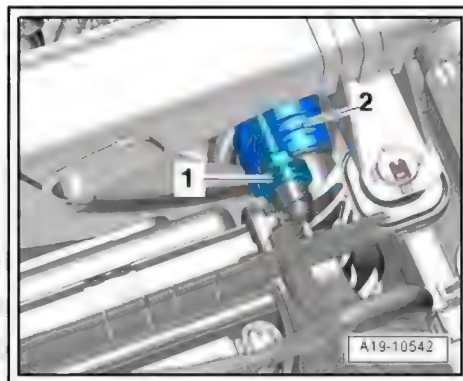
*Disregard -item 2-.*



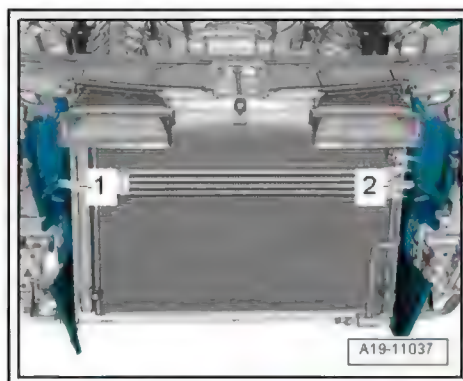
- Lift retaining clips -1, 2- and detach connection (top left) from radiator.



—(10) copies of the corrected or amended notice

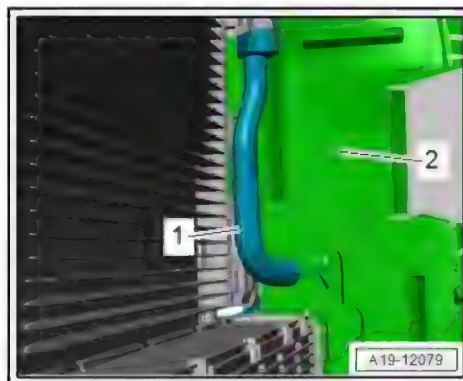


- Unclip air ducts -1, 2- from radiator.



### Note

- ◆ Depending on the version, an air duct -2- that surrounds the refrigerant line -1- may be fitted on the left, as shown in the illustration.
- ◆ This air duct cannot be removed and remains in its installation position after the radiator has been unclipped.

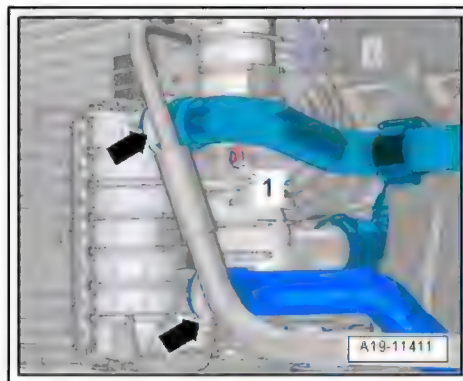


- Remove bolt -1-



### Note

*Disregard -arrows-.*



- Push catch down -arrow A- and move water radiator for charge air cooling circuit slightly in direction of -arrow B-.
- Detach water radiator for charge air cooling circuit from radiator and swivel it to the left with coolant hoses attached, carefully moving item(s) clear at the air duct (left-side), if necessary.



Note

Disregard -item 1-.

- Unplug electrical connector -2- on refrigerant pressure and temperature sender - G395- .

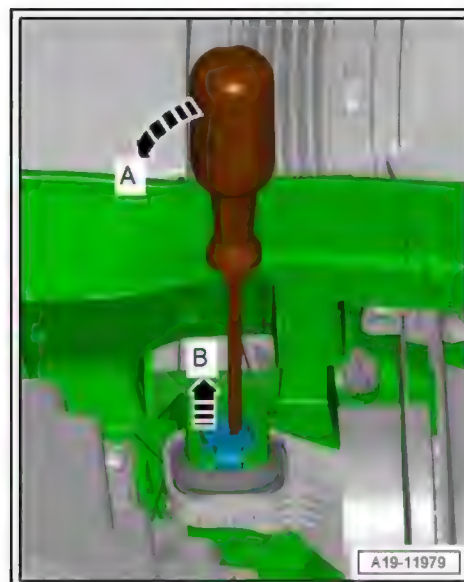
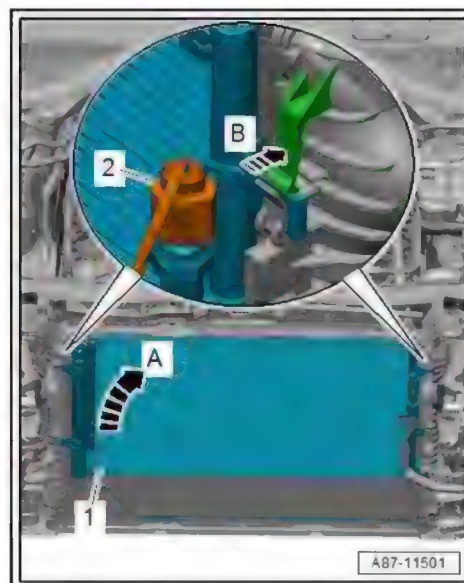
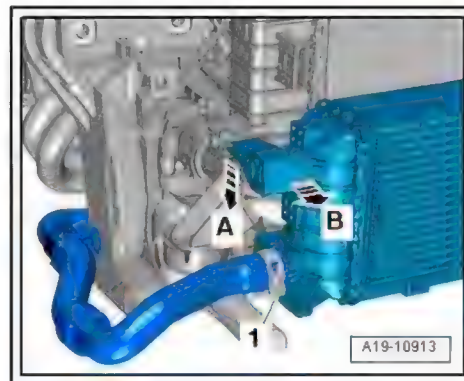


Caution

*Risk of damage to condenser, refrigerant lines and refrigerant hoses.*

◆ *Do NOT stretch, kink or bend refrigerant lines and hoses.*

- Disengage retaining clip in direction of -arrow B- on both sides.
- First pull condenser -1- out of radiator on right side in direction of -arrow A-.
- Then carefully guide condenser out on the left, paying attention to the refrigerant lines.
- Swivel condenser to left side.
- Release retaining pins for radiator on both sides -arrow A- and pull out upwards -arrow B-.



Protected by copyright. Copying for private or commercial purposes in part or in whole is not permitted unless authorized by Audi AG. Audi AG does not guarantee or accept any liability with regard to the correctness of information in this document. Copyright © Audi AG.

- Remove bolts -1- on both sides and detach radiator bracket with radiator from lock carrier -arrow-.
- Detach radiator.



- Press locking tabs on left and right sides of radiator cowl together -arrow- and lift radiator cowl off radiator.

#### Installing

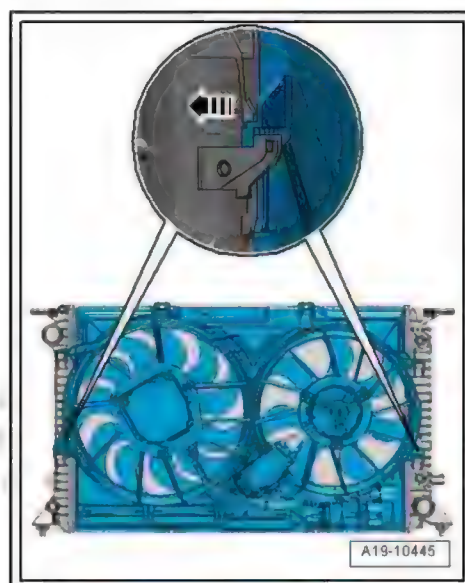
Installation is carried out in reverse order; note the following:



#### Note

If there are slight impressions on the fins, refer to [⇒ "3.5 Installing radiators and condensers", page 6](#).

- Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Connect coolant hoses and connection with plug-in connector [⇒ page 223](#).



#### Note

Do not reuse coolant.

- Fill up with coolant [⇒ page 185](#).

#### Tightening torques

- ◆ [⇒ "4.1 Exploded view - radiators/radiator fans", page 222](#)
- ◆ [⇒ "3.1 Exploded view - air cleaner housing", page 292](#)
- ◆ ⇒ Heating, air conditioning; Rep. gr. 87 ; Refrigerant circuit; Exploded view - condenser
- ◆ ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - impact bar
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

## 4.4 Removing and installing water radiator for charge air cooling circuit

Special tools and workshop equipment required

- ◆ Hose clamps, up to 25 mm - 3094-



- ◆ Drip tray for workshop hoist - VAS 6208-



- ◆ Hose clip pliers - VAS 6362-



## Removing

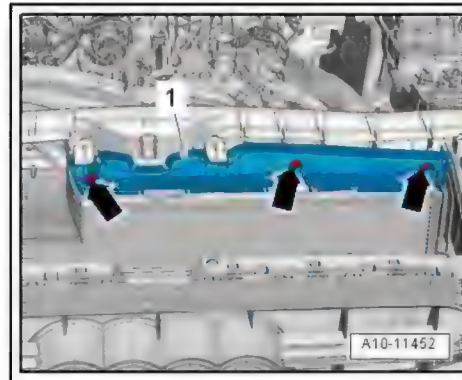
- Remove lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing attachments .
- Remove closure plate for bumper cover (front) ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing attachments .
- Remove air intake grille (left and right) ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing attachments .



Copyright © 2018 Audi AG. All rights reserved. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorized by AUDI AG/AUDI AG (and/or its subsidiaries) in writing. All other rights reserved.



- Remove bolts -arrows- and detach air duct -1-.

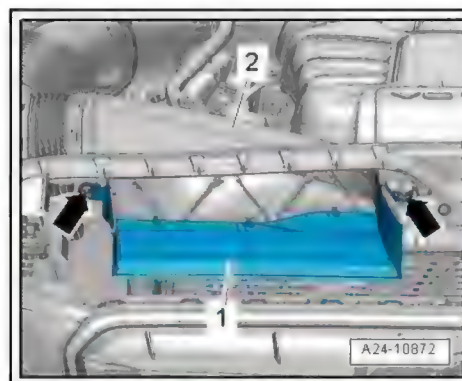


- Remove bolts -arrows- and detach air duct -1- from lock carrier.

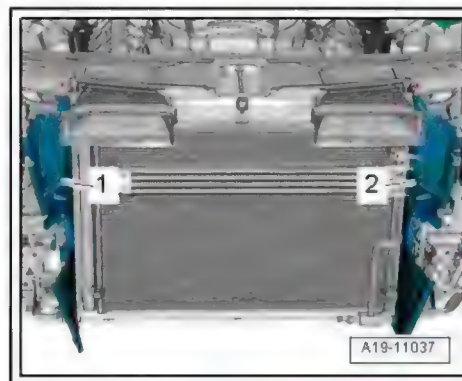


Note

Disregard -item 2-.

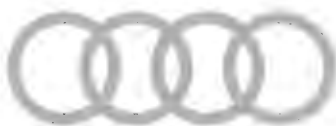
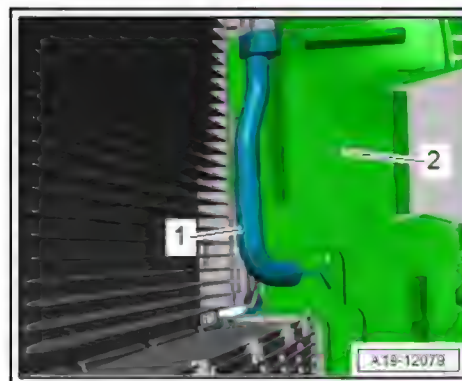


- Unclip air ducts -1, 2- from radiator.



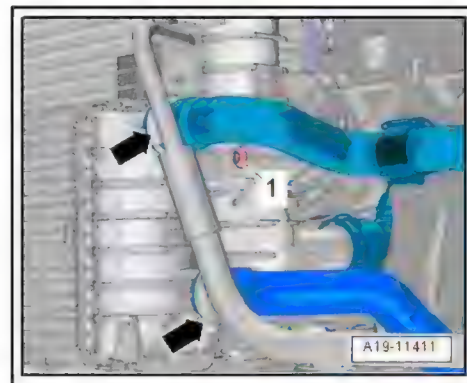
Note

- ◆ Depending on the version, an air duct -2- that surrounds the refrigerant line -1- may be fitted on the left, as shown in the illustration.
- ◆ This air duct cannot be removed and remains in its installation position after the radiator has been unclipped.

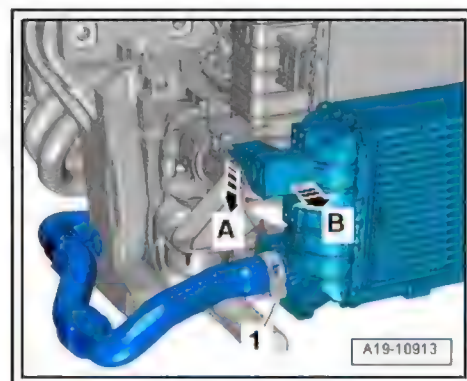


Produced by copyrighting company & is made of electronic pictures in part of it which is not permitted to be used by other companies without the permission of Audi AG. Audi AG does not guarantee or assume any liability for the correctness of the information in this document. Copyright by Audi AG.

- Clamp off coolant hoses using hose clamps -3094- , release hose clips -arrows- and disconnect hoses.
- Remove bolt -1-.



- Push catch down -arrow A- and move water radiator (front) for charge air cooling circuit slightly in direction of -arrow B-.
- Detach water radiator (front) for charge air cooling circuit from radiator and remove it downwards, carefully moving item(s) clear at air duct (left-side), if necessary.



Note

Disregard -item 1-.

#### Installing

Installation is carried out in reverse order; note the following:



Note

- ◆ If there are slight impressions on the fins, refer to ⇒ ["3.5 Installing radiators and condensers", page 6](#) .
- ◆ Secure all hose connections with correct type of hose clips (as original equipment) ⇒ *Electronic parts catalogue* .
- Install air intake grille, closure plate for bumper cover and lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing attachments .



Note

Do not reuse coolant.

- Fill up with coolant ⇒ [page 185](#) .

Tightening torques right. Copying for private or commercial purposes is prohibited. In part for Audi AG, Audi AG is not responsible for the content of this document. Audi AG is not responsible for the content of this document.

- ◆ ⇒ ["4.1 Exploded view - radiators/radiator fans", page 222](#)
- ◆ Refrigerant line ⇒ Heating, air conditioning; Rep. gr. 87 ; Refrigerant circuit; Exploded view - condenser
- ◆ ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Exploded view - impact bar

## 4.5 Removing and installing radiator cowl

### Removing

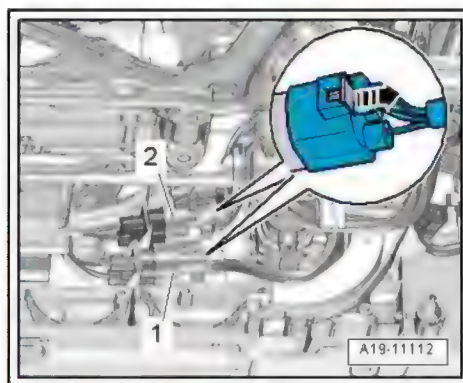


#### WARNING

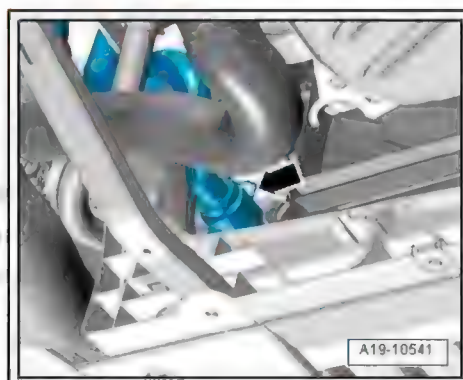
*Risk of injury as the radiator fans may start up automatically.*

- ◆ *Even when the ignition is switched off, the radiator fans can start up without warning due to accumulated heat in the engine compartment, etc.*

- Remove noise insulation (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Unplug electrical connectors -1, 2- for radiator fan (push retainer to the rear -arrow- and press down release catch).
- Drain coolant ⇒ [page 183](#) .
- Remove water radiator for charge air cooling circuit ⇒ ["4.4 Removing and installing water radiator for charge air cooling circuit", page 230](#) .



- Detach connection from radiator (lift retaining clip -arrow-).

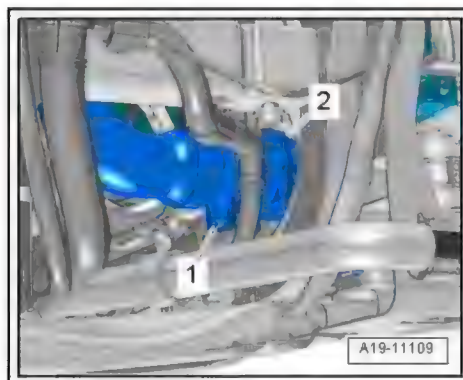


- Lift retaining clip -2- and detach connection from radiator.



#### Note

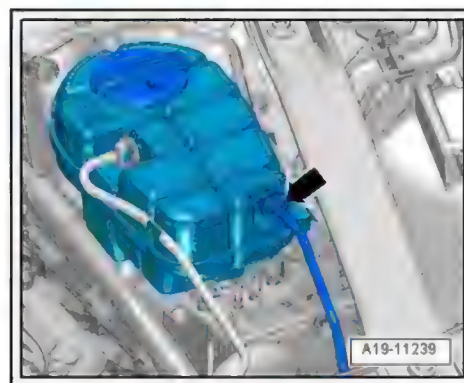
*Disregard -item 1-.*



- Remove bolt -1- on both sides.



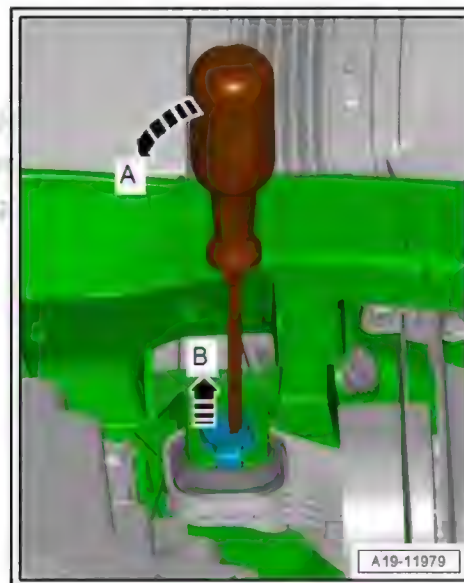
- Lift retaining clip -arrow- and disconnect coolant hoses from coolant expansion tank.



- Release retaining pins for radiator on both sides -arrow A- and pull out upwards -arrow B-.

- Press bottom of radiator slightly towards front.

Protected by copyright. Copying for private or commercial purposes, in whole or in part, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee the accuracy of the information with respect to the correctness of information in this document. Copying for private or commercial purposes, in whole or in part, is not permitted unless authorised by AUDI AG.



- Press and release locking tabs (left and right) for radiator cowl -arrow- simultaneously.
- Remove radiator cowl downwards.

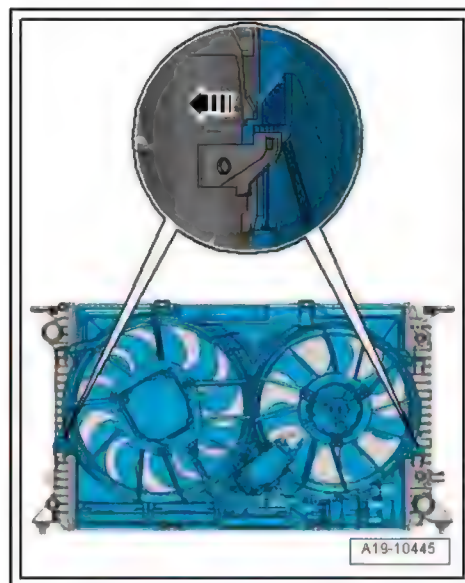
#### Installing

Installation is carried out in reverse order; note the following:

- Connect coolant hose with plug-in connector ⇒ [page 223](#) .

#### Tightening torques

- ◆ ⇒ [“3.1 Exploded view - air cleaner housing”, page 292](#)
- ◆ ⇒ [“3.1 Exploded view - secondary air system”, page 354](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation



## 4.6 Removing and installing radiator fan - V7-

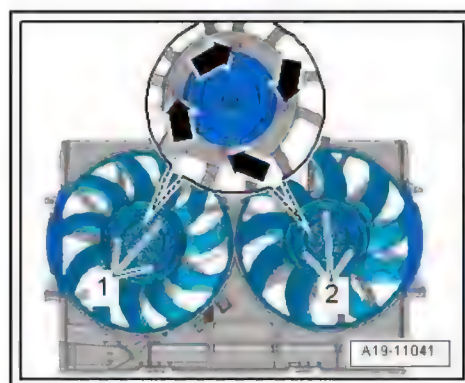
#### Removing



#### Note

*Re-install all cable ties in the same locations when installing.*

- Remove radiator cowl  
⇒ [“4.5 Removing and installing radiator cowl”, page 234](#) .
- Remove bolts -1- or -2- and detach corresponding fan wheel.
- Remove bolts -arrows- on radiator fan.
- Move electrical wiring harness clear and detach radiator fan.



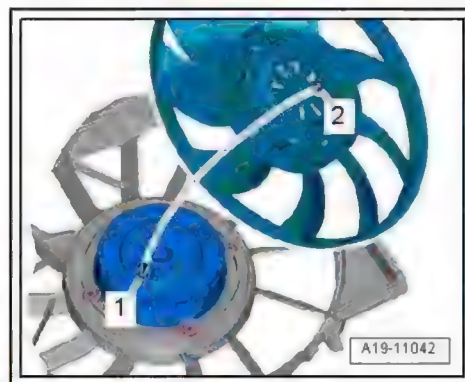
#### Installing

Installation is carried out in reverse order; note the following:

- Note installation position of fan wheel.
- Pin -2- must engage in hole -1-.
- Install radiator cowl  
⇒ [“4.5 Removing and installing radiator cowl”, page 234](#) .

#### Tightening torques

- ◆ ⇒ [“4.1 Exploded view - radiators/radiator fans”, page 222](#)



## 4.7 Removing and installing auxiliary radiator

Special tools and workshop equipment required

- ◆ Hose clamps, up to 25 mm - 3094-



- ◆ Drip tray for workshop hoist - VAS 6208-



Protected by Copyright. Copying for private or commercial purposes, in whole or in part, is not permitted without authorisation by AUDI AG. AUDI AG does not hold any liability for damages of whatsoever kind arising from the use of this document.



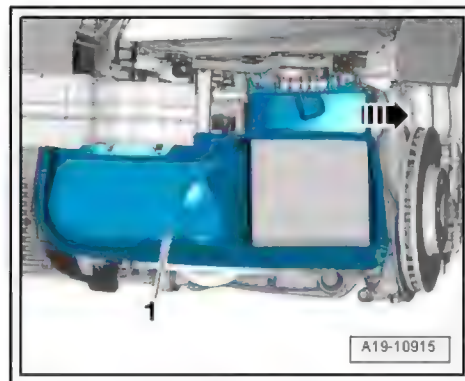
- ◆ Hose clip pliers - VAS 6362-



## Removing

- Remove noise insulation (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Remove wheel housing liner (front left) ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Removing and installing wheel housing liner (front) .
- Remove bumper cover (front) ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing bumper cover .

- Unclip air duct -1- in direction of -arrow- and remove.



- Place drip tray for workshop hoist - VAS 6208- underneath.
- Clamp off coolant hoses using hose clamps -3094- , release hose clips -arrows- and disconnect hoses.
- Remove bolts -2-.
- Lift radiator -1- off bracket.

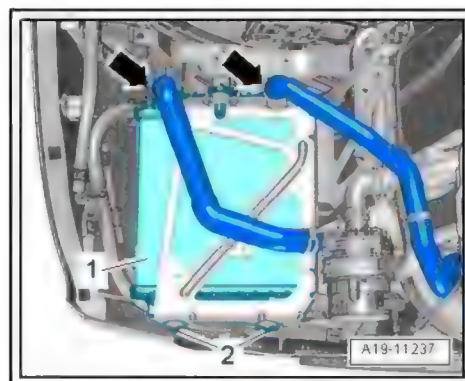
#### Installing

Installation is carried out in reverse order; note the following:



#### Note

- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ Electronic parts catalogue .*
- ◆ *The coolant in the entire system must be changed if the radiator is renewed.*
- Install bumper cover (front) ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing bumper cover .
- Check coolant level ⇒ [page 185](#) .



#### Tightening torques

- ◆ ⇒ ["4.2 Exploded view - auxiliary radiator", page 225](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front)

## 21 – Turbocharging/supercharging

### 1 Supercharger

⇒ [“1.1 Exploded view - supercharger”, page 239](#)

⇒ [“1.2 Exploded view - magnetic clutch”, page 242](#)

⇒ [“1.3 Exploded view - rotor assembly”, page 243](#)

⇒ [“1.4 Removing and installing supercharger”, page 244](#)

⇒ [“1.5 Checking supercharger for leaks”, page 250](#)

⇒ [“1.6 Removing and installing magnetic clutch”, page 252](#)

⇒ [“1.7 Removing and installing pulley for supercharger”, page 259](#)

⇒ [“1.8 Removing and installing drive unit”, page 260](#)

⇒ [“1.9 Removing and installing rotor assembly”, page 263](#)

⇒ [“1.10 Renewing drive shaft oil seal”, page 267](#)

⇒ [“1.11 Securing supercharger to engine and gearbox support”, page 269](#)

⇒ [“1.12 Removing and installing sender 1 for turbocharger speed G688”, page 272](#)

#### 1.1 Exploded view - supercharger

## 1 - Supercharger

- ☐ With charge air coolers
- ☐ Removing and installing supercharger

⇒ ["1.4 Removing and installing supercharger", page 244](#)

- ☐ Exploded view - charge air coolers
- ⇒ ["2.1 Exploded view - charge air system", page 274](#)

- ☐ Secure to engine and gearbox support - VAS 6095- when performing assembly work
- ⇒ ["1.11.1 Securing supercharger to engine and gearbox support for assembly work", page 269](#)

- ☐ Secure to engine and gearbox support - VAS 6095- when checking for leaks
- ⇒ ["1.11.2 Securing supercharger to engine and gearbox support for leak test", page 270](#)

## 2 - Ball stud

- ☐ For engine cover panel
- ☐ 5 Nm

## 3 - Insulating plate

## 4 - Bolt

- ☐ 5 Nm

## 5 - O-rings

- ☐ Renew after removing

## 6 - Bolt

- ☐ Tightening torque ⇒ [Fig. "" Throttle valve module -J338- - tightening torque"" , page 297](#)

## 7 - Throttle valve module - J338-

- ☐ Removing and installing ⇒ ["4.3 Removing and installing throttle valve module J338 ", page 301](#)

## 8 - Intermediate flange

## 9 - O-rings

- ☐ Renew after removing

## 10 - Bolt

- ☐ Tightening torque and sequence
- ⇒ [Fig. "" Regulating flap control unit -J808- - tightening torque and sequence"" , page 297](#)

## 11 - Intermediate flange

## 12 - Regulating flap control unit - J808-

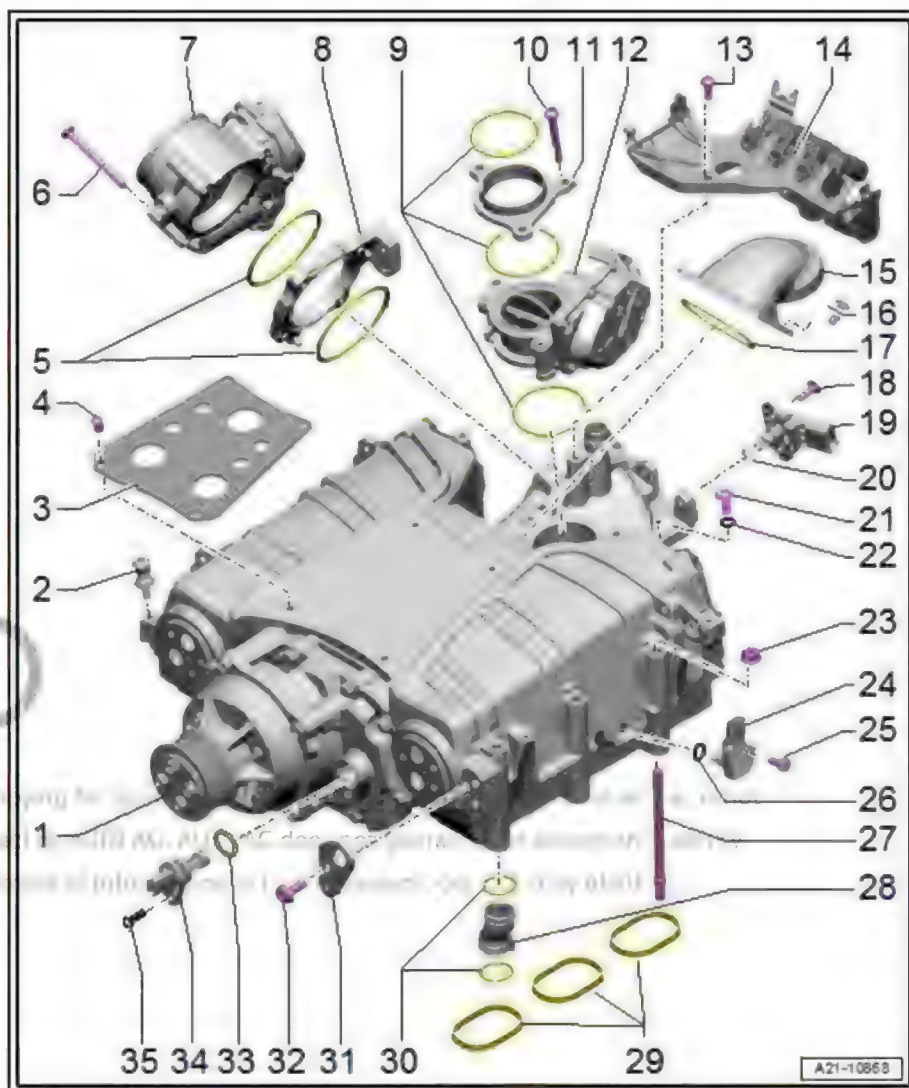
- ☐ Removing and installing ⇒ ["4.4 Removing and installing regulating flap control unit J808 ", page 303](#)

## 13 - Bolt

- ☐ 9 Nm

## 14 - Bracket

- ☐ For change-over valves



15 - Connection

16 - Bolt

- ☐ Tightening torque and sequence

⇒ [Fig. ""Regulating flap control unit -J808- - tightening torque and sequence""](#) , page 297

17 - O-ring

- ☐ Renew after removing

18 - Bolt

- ☐ 10 Nm

19 - Intake air temperature sender - G42- / intake manifold pressure sender - G71-

- ☐ Removing and installing

⇒ ["6.1 Removing and installing intake air temperature sender G42 / intake manifold pressure sender G71"](#) , page 318

20 - O-ring

- ☐ Renew after removing

21 - Bleeder screw

- ☐ For charge air cooler
- ☐ 1.5 ... 3.0 Nm

22 - Seal

- ☐ Renew after removing

23 - Nut

- ☐ 20 Nm

24 - Charge pressure sender

- ☐ Cylinder bank 1 (right-side): charge pressure sender - G31-
- ☐ Cylinder bank 2 (left-side): charge pressure sender 2 - G447-
- ☐ Removing and installing

⇒ ["2.4 Removing and installing charge pressure sender G31 / G447"](#) , page 280

25 - Bolt

- ☐ 10 Nm

26 - O-ring

- ☐ Renew after removing

27 - Stud

- ☐ 17 Nm

28 - Connection

- ☐ For crankcase breather

- ☐ Installation position ⇒ [Fig. ""Installing connection for crankcase breather""](#) , page 168

29 - Seals

- ☐ Renew after removing

30 - O-rings

- ☐ 2x on USA versions
- ☐ Renew after removing

31 - Engine lifting eye

32 - Bolt

- ☐ 27 Nm

33 - O-ring

- ☐ Renew after removing

### 34 - Sender 1 for turbocharger speed - G688-

- ☐ Removing and installing  
⇒ ["1.12 Removing and installing sender 1 for turbocharger speed G688", page 272](#)
- ☐ Do not use opening to check oil level

### 35 - Bolt

- ☐ 10 Nm

## 1.2 Exploded view - magnetic clutch

### 1 - Pulley

- ☐ For supercharger
- ☐ Removing and installing  
⇒ ["1.7 Removing and installing pulley for supercharger", page 259](#)

### 2 - Bolt

- ☐ Renew after removing
- ☐ 20 Nm +90°

### 3 - Magnetic clutch

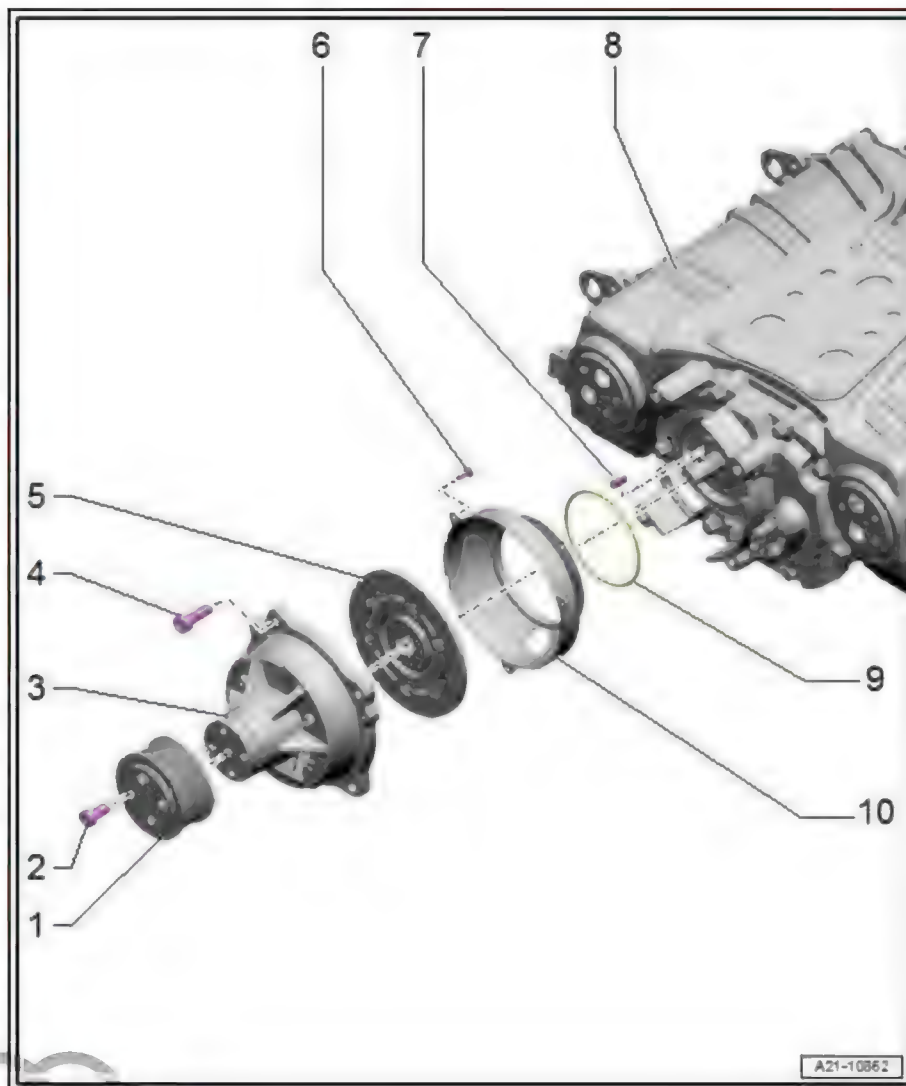
- ☐ Removing and installing  
⇒ ["1.6 Removing and installing magnetic clutch", page 252](#)

### 4 - Bolt

- ☐ 20 Nm

### 5 - Carrier

- ☐ Only renew together with -item 3-
- ☐ Do not loosen bolts on armature
- ☐ Renew armature if nuts are loose
- ☐ Removing and installing  
⇒ ["1.6 Removing and installing magnetic clutch", page 252](#)
- ☐ Clean friction lining and friction surface with brake cleaner before installing
- ☐ Tightening torque for clamping bolt  
⇒ [Fig. "Tightening torque for clamping bolt", page 243](#)



### 6 - Bolt

- ☐ 3.6 Nm

### 7 - Woodruff key

### 8 - Supercharger

### 9 - O-ring

- ☐ Renew after removing

### 10 - Trim

Tightening torque for clamping bolt

- Tighten clamping bolt -arrow- to 20 Nm.



### 1.3 Exploded view - rotor assembly

#### 1 - Bolt

- ☐ 27 Nm
- ☐ Remove old sealant/locking fluid from threads (using a thread tap or similar)
- ☐ Before installing, lubricate a few threads of the cleaned bolts with sealant ⇒ Electronic parts catalogue

#### 2 - Drive unit

- ☐ Always renew oil seal -item 3- after removing
- ☐ Removing and installing ⇒ ["1.8 Removing and installing drive unit", page 260](#)

#### 3 - Oil seal

- ☐ For drive shaft
- ☐ Renewing ⇒ ["1.10 Renewing drive shaft oil seal", page 267](#)

#### 4 - Dowel sleeve

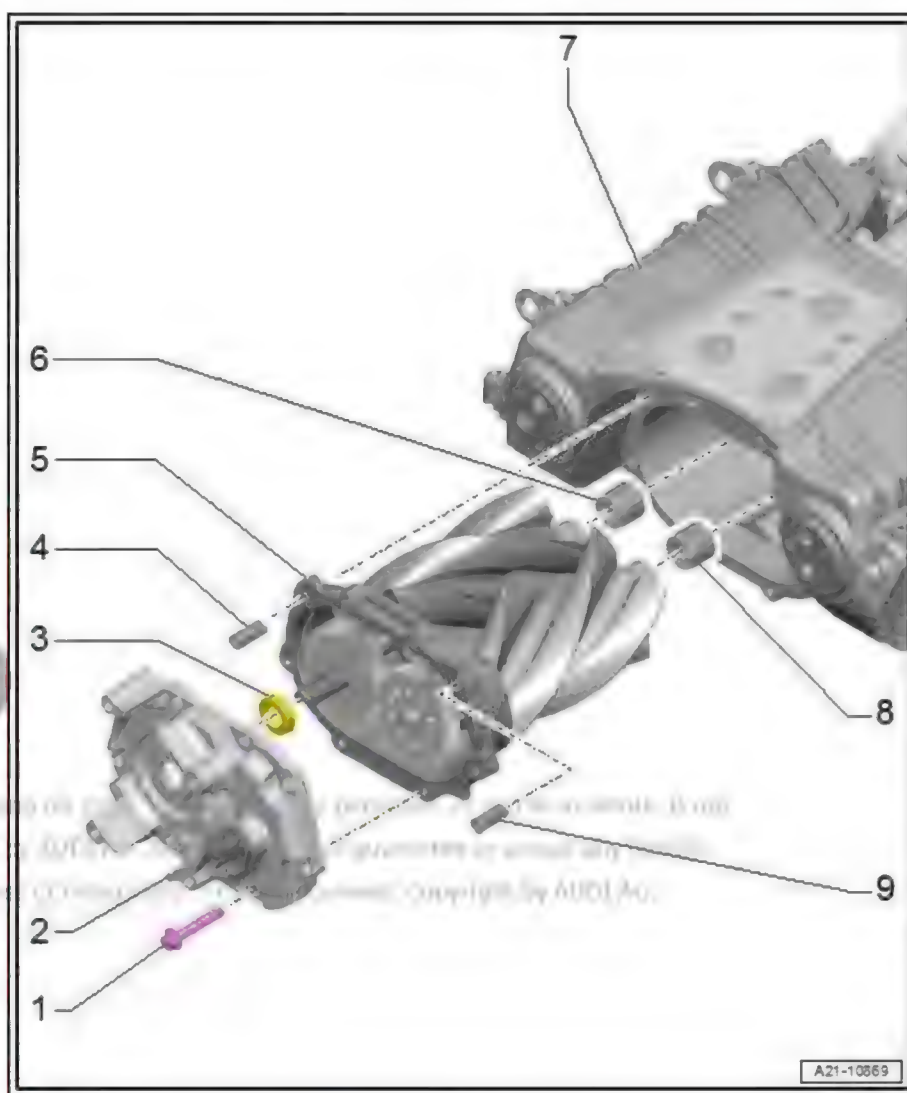
#### 5 - Rotor assembly

- ☐ Removing and installing ⇒ ["1.9 Removing and installing rotor assembly", page 263](#)
- ☐ After every removal and installation ⇒ ["1.5 Checking supercharger for leaks", page 250](#)

- ☐ Remove old sealant/locking fluid from threads (using a thread tap or similar)

#### 6 - Needle bearing

- ☐ For rotor assembly
- ☐ Renew together with rotor assembly ⇒ ["1.9 Removing and installing rotor assembly", page 263](#)





7 - Supercharger housing

8 - Needle bearing

☐ For rotor assembly

☐ Renew together with rotor assembly ⇒ ["1.9 Removing and installing rotor assembly", page 263](#)

9 - Dowel sleeve

## 1.4 Removing and installing supercharger

Special tools and workshop equipment required

◆ Hose clamps, up to 25 mm - 3094-



◆ Engine bung set - VAS 6122-



◆ Drip tray for workshop hoist - VAS 6208-



- ◆ Hose clip pliers - VAS 6362-



- ◆ Adapter for cooling system tester - V.A.G 1274/8-



- ◆ Cooling system tester - V.A.G 1274 B-



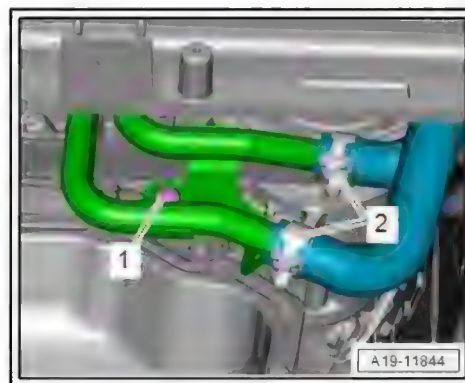
## Removing



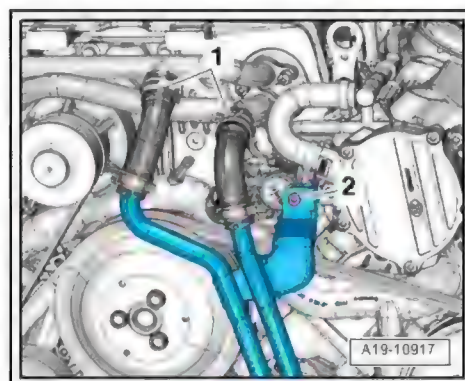
### Note

- ◆ *Observe rules for cleanliness*  
 ⇒ ["3.1 Rules for cleanliness", page 5](#).
- ◆ *Check that all air pipes and hoses and vacuum lines are correctly fitted and that there are no leaks before carrying out tests or repairs.*
- Remove poly V-belt for supercharger  
 ⇒ ["1.2.1 Removing and installing poly V-belt for supercharger", page 47](#).

- Place drip tray for workshop hoist - VAS 6208- underneath.
- Remove bolt -1-.
- Clamp off coolant hoses -2- with hose clamps, up to 25 mm - 3094- .



- Place drip tray for workshop hoist - VAS 6208- underneath.
- Release hose clips -1- and detach coolant hoses from coolant pipes at supercharger.
- Remove bolt -2- and press coolant pipes to the side.

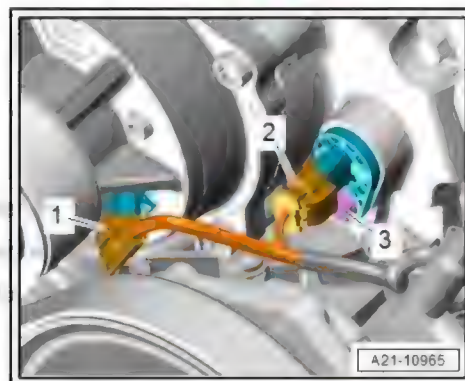


- Unplug electrical connectors -1, 2-.

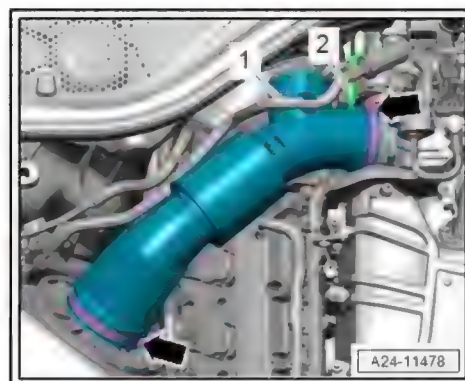


### Note

*Disregard -item 3-*



- Move hose -1- for activated charcoal filter system clear at air pipe.
- Detach vacuum hose -2- from connection on air pipe.
- Loosen hose clips -arrows- and detach air pipe.

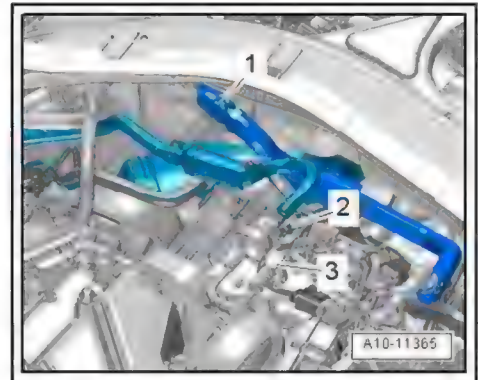


- Unplug electrical connector -2- at activated charcoal filter solenoid valve 1 - N80- and detach vacuum hose -3- (press release tabs).
- Detach activated charcoal filter solenoid valve 1 - N80- from bracket and move it clear to the side with hoses still attached.

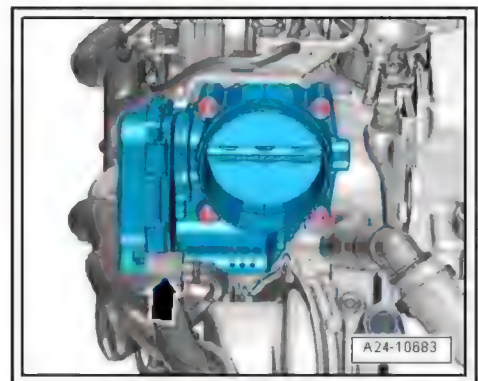


Note

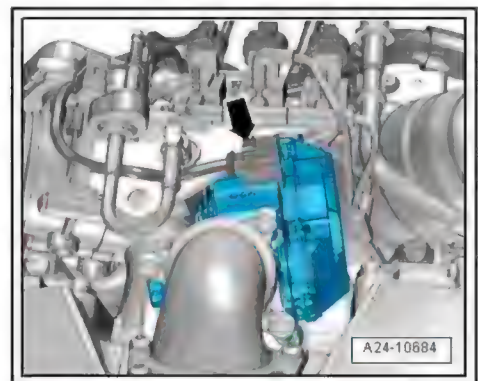
*Disregard -item 1-.*



- Unplug electrical connector -arrow- at throttle valve module - J338- .



- Unplug electrical connector -arrow- at regulating flap control unit - J808- .



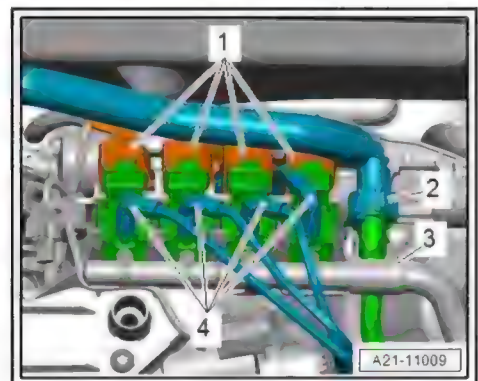
- Unplug electrical connectors -1-.



Note

*Mark installation position of vacuum hoses for re-installation.*

- Disconnect vacuum hoses -4- and vacuum line -3-.
- Disconnect vacuum hose -2-, move it clear and place it to left side.

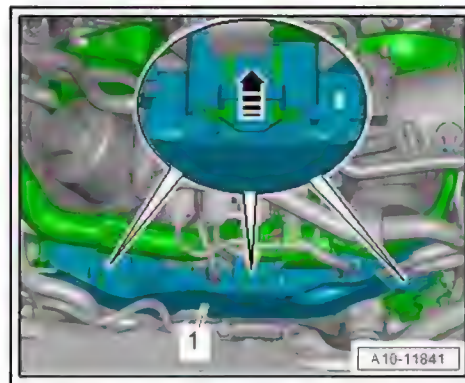


*Trademarks and registered trademarks of Audi AG and its subsidiaries are used under license.*

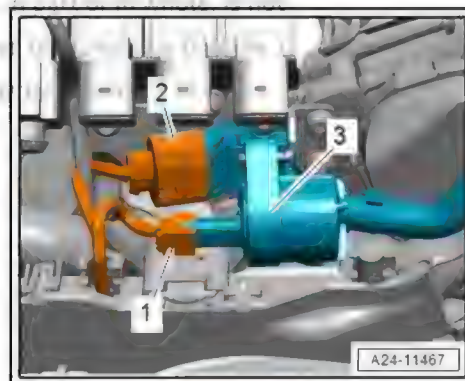
© 2018 Audi AG. All rights reserved. Unless authorised by AUDI AG, AUDI AG does not guarantee or accept any liability

with respect to the correctness of information in this document. Copyright by AUDI AG.

- Release fasteners -arrow- and press wiring duct -1- towards rear.



- Unplug electrical connector -1-.
- Detach valve -3- for crankcase breather system from bracket.
- Unplug electrical connector -2- at intake air temperature sender - G42- / intake manifold pressure sender - G71- .



- Unplug electrical connectors -1, 2-.
- Remove nuts -arrows- and lift off supercharger with charge air coolers.
- Seal openings on supercharger and all relevant ducts and hoses of the charge air system using plugs from engine bung set - VAS 6122- or clean cloths.
- Detach noise insulation panels.

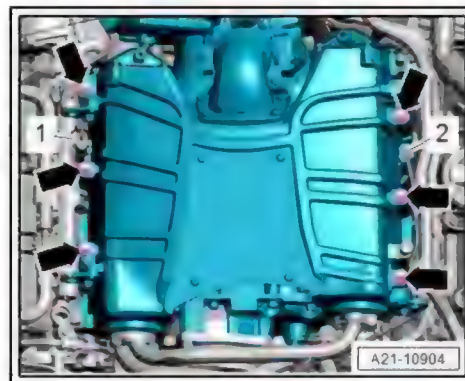
#### Installing

Installation is carried out in reverse order; note the following:

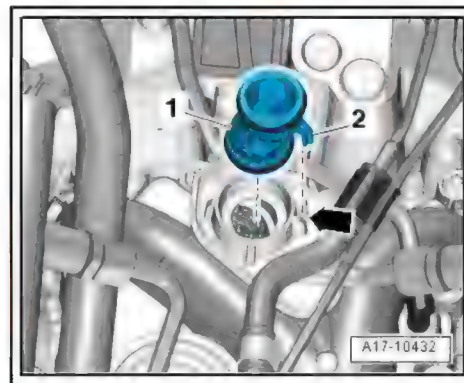


#### Note

- ◆ *Renew seals and O-rings after removal.*
- ◆ *Do not remove plugs or protective caps until you are ready to fit the relevant line.*
- ◆ *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*
- Fit noise insulation panels.



- Ensure that crankcase breather connection -1- is positioned correctly when fitting supercharger  
⇒ [Fig. "Installing connection for crankcase breather"](#),  
[page 168](#) .
- Install coolant pipes (front left)  
⇒ ["3.2.2 Removing and installing coolant pipes \(front left\)"](#),  
[page 209](#) .
- Electrical connections and routing ⇒ Current flow diagrams,  
Electrical fault finding and Fitting locations.
- Install poly V-belt for supercharger  
⇒ ["1.2.1 Removing and installing poly V-belt for supercharger"](#),  
[page 47](#) .
- Check coolant level and top up if necessary.



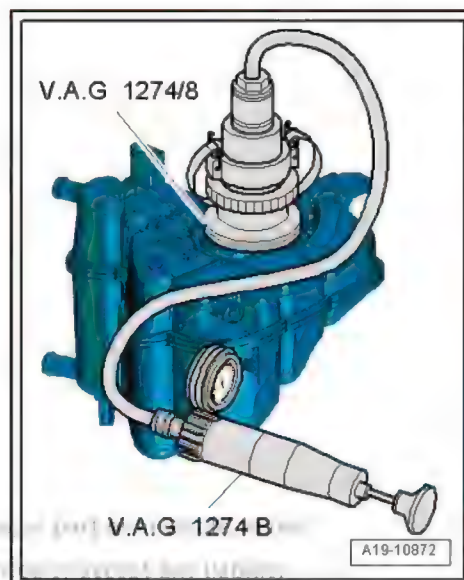
#### Note

*Do not reuse coolant.*

- Open filler cap on coolant expansion tank.
- Fit cooling system tester - V.A.G 1274 B- with adapter -  
V.A.G 1274/8- onto coolant expansion tank.
- Using hand pump on cooling system tester, build up a pressure of approx. 0.5 bar.



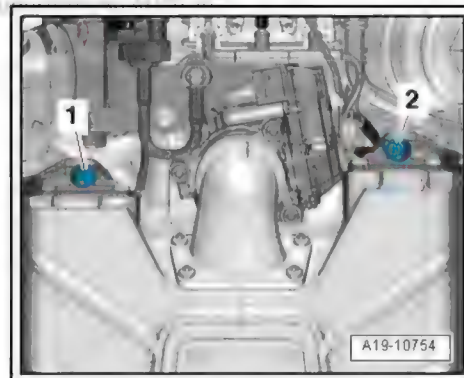
Protected by copyright. Copying for private or commercial purposes is prohibited without permission by Audi AG. Audi AG does not assume any liability for the correctness of information in this document. Copyright 2018 Audi AG



#### Note

*Place a cloth underneath to catch escaping coolant.*

- Open bleeder screws -1- and -2- on charge air coolers one after the other until coolant comes out.
- If necessary, correct the pressure during the bleeding procedure using the hand pump on the cooling system tester.
- Close bleeder screws.

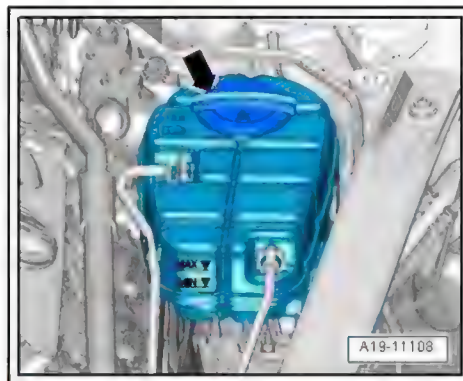




- Check coolant level and top up if necessary.
- The coolant level must be at the MAX marking when the engine is cold.
- The coolant level can be above the MAX marking when the engine is warm.

#### Tightening torques

- ◆ ⇒ [“1.1 Exploded view - supercharger”, page 239](#)
- ◆ ⇒ [“2.2 Exploded view - hose connections for charge air system”, page 275](#)



## 1.5 Checking supercharger for leaks

### Special tools and workshop equipment required

- ◆ Charge air system tester - V.A.G 1687- with adapters -V.A.G 1687/4- , -V.A.G 1687/10- , -V.A.G 1687/13-1- and -V.A.G 1687/13-2-



### Procedure

- Supercharger secured to engine and gearbox support - VAS 6095- for leak test  
⇒ [“1.11.1 Securing supercharger to engine and gearbox support for assembly work”, page 269](#) .
- Regulating flap control unit - J808- installed  
⇒ [“4.4 Removing and installing regulating flap control unit J808”, page 303](#) .
- Secure adapter -V.A.G 1687/13-1- to bottom of supercharger housing.
- Secure hose connections with hose clips.

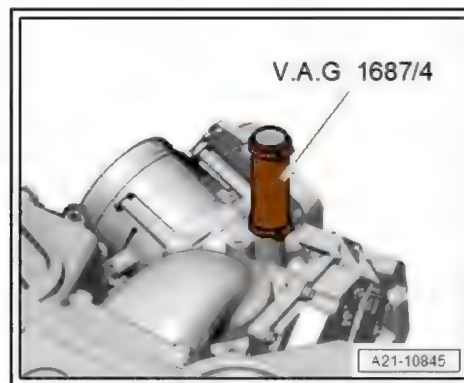


#### Note

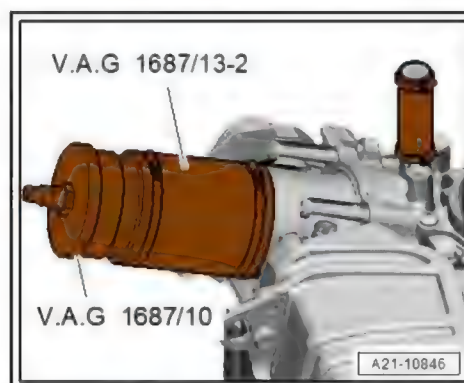
*For illustration purposes the supercharger is shown without the gearbox support.*



- Secure adapter -V.A.G 1687/4- to top of supercharger housing.
- Secure hose connections with hose clips.

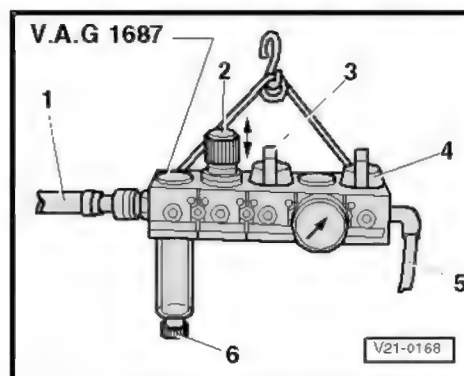


- Secure adapter -V.A.G 1687/13-2- to supercharger housing with adapter - V.A.G 1687/10- .
- Secure hose connections with hose clips.

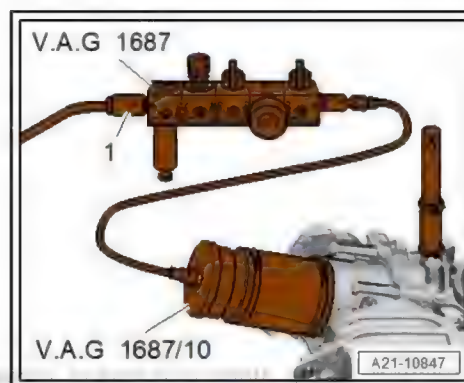


Prepare charge air system tester - V.A.G 1687- as follows:

- Unscrew pressure control valve -2- completely and close valves -3- and -4-.
- Make sure knob is pulled out before turning pressure control valve.



- Connect charge air system tester - V.A.G 1687- as shown in illustration, and connect to compressed air line using a commercially available connection piece -1-.



Printed by copyright. Using for private or commercial purposes without written permission by AUDI AG, AUDI AG does not guarantee or accept any liability with respect to the correctness of information and/or instructions. Copyright © AUDI AG.

- If there is water in sight glass, remove drain plug -6- and drain water.
- Open valve -3-.



### Caution

*Risk of damage if pressure is set too high.*

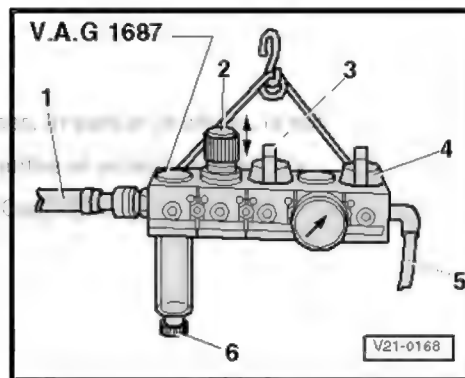
- ◆ *The pressure must not exceed 0.5 bar.*

- Adjust pressure to 0.5 bar via pressure control valve -2-.
- Open valve -4- and wait until test system is pressurised. If necessary, adjust pressure to 0.5 bar again.
- Close valve -3-.
- Pressure must not drop by more than 0.1 bar for 30 seconds.
- Check charge air system for audible leaks or leaks that can be felt with the hand; apply commercially available leak detecting spray or use ultrasonic tester - V.A.G 1842- .



### Note

- ◆ *For operation of ultrasonic tester -V.A.G 1842- , refer to ⇒ Operating instructions .*
- ◆ *Release pressure in test circuit by detaching hose coupling from adapter before removing adapter.*



## 1.6 Removing and installing magnetic clutch

Special tools and workshop equipment required

- ◆ Puller -T40301-



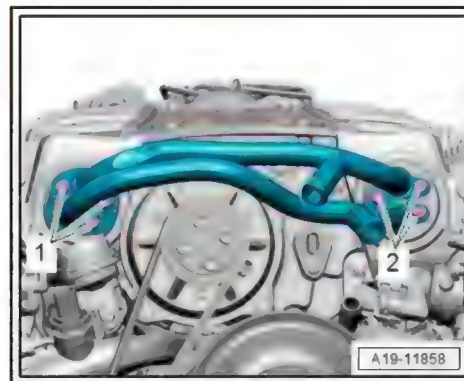
- ◆ Centring pin -T40302-



- ◆ External power supply unit for clutch for supercharger - VAS 6909-

#### Removing

- Supercharger secured to engine and gearbox support for assembly work  
 ⇒ ["1.11.1 Securing supercharger to engine and gearbox support for assembly work", page 269](#) .
- Remove bolts -1- and -2- and detach coolant pipes from supercharger.

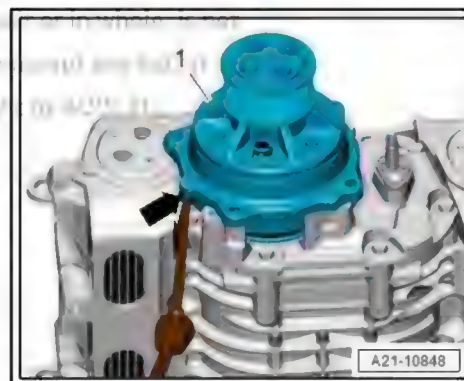


- Remove bolts -arrows-.

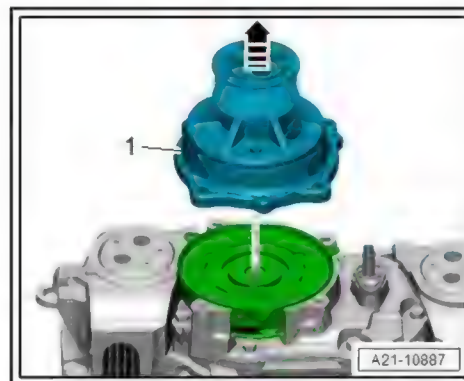


- Pro Lift magnetic clutch -1- slightly and turn it until one of the three bolts for trim is accessible.

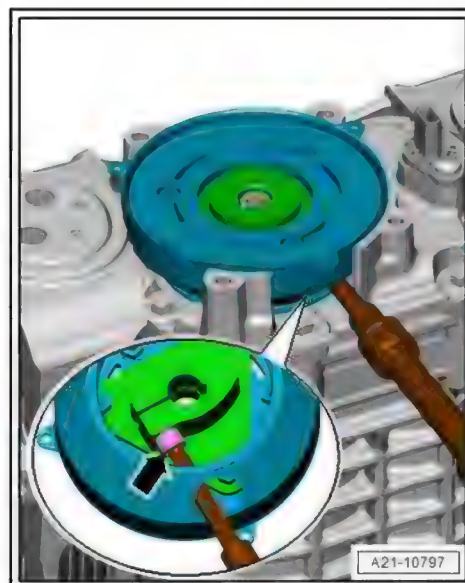
- Remove first bolt -arrow-.
- Remove remaining bolts; to do so, turn magnetic clutch  $\frac{1}{3}$  of a rotation each time.



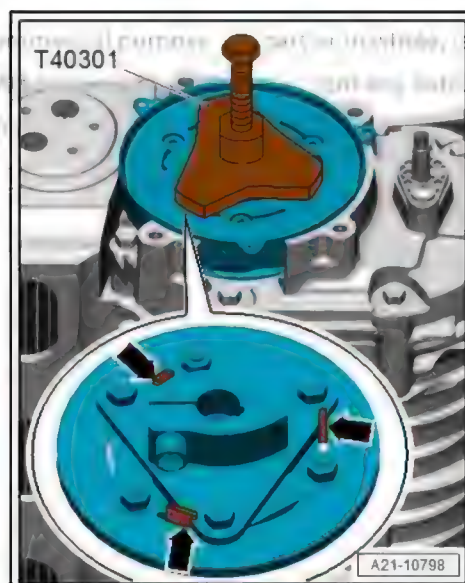
- Detach magnetic clutch -1- -arrow-.



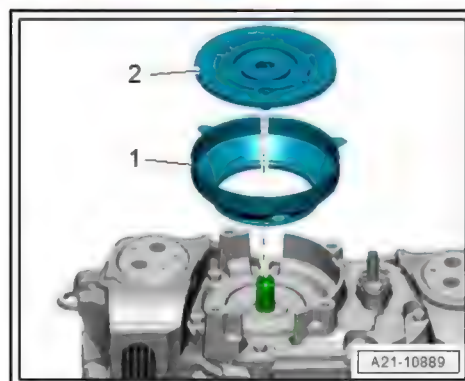
- Loosen clamping bolt -arrow- for armature by two turns (turn armature to corresponding position).



- Apply puller -T40301- to armature.
- Claws -arrows- of puller must engage on armature as shown in illustration.



- Detach armature -2- and remove.
- Detach trim -1-.



- Remove O-ring -arrow-.

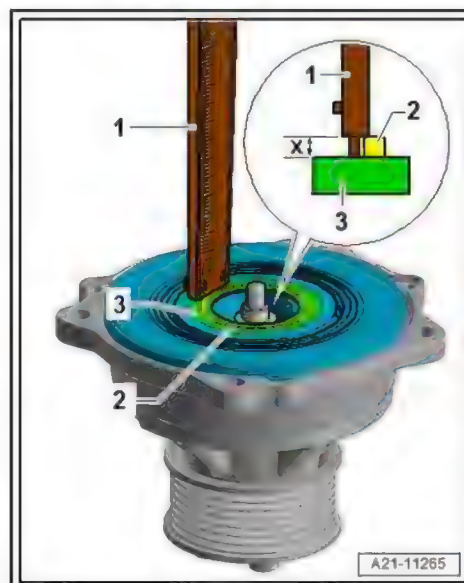
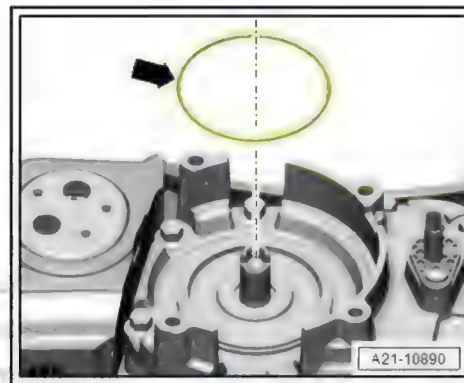
Checking for wear on inner and outer friction linings



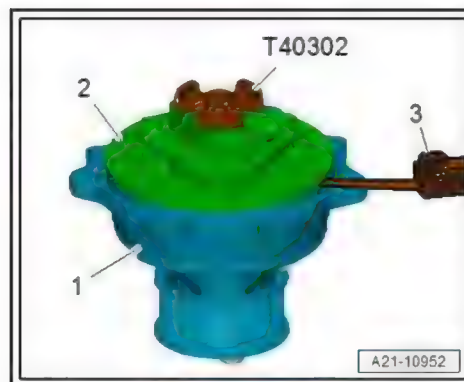
#### Note

*Before re-installing a used magnetic clutch, the degree of wear on the inner and outer friction linings must be checked. This step is not necessary when fitting a new magnetic clutch.*

- Position caliper gauge -1- on highest point of inner friction lining -2- (as shown in illustration) and measure distance -X- to friction surface -3-.
- Specification: at least 0.2 mm.
- Perform measurement in at least three different positions around circumference.
- If specification is not met, renew magnetic clutch.



- Fit armature -2- onto magnetic clutch -1- and tighten centring pin -T40302- hand-tight.
- Use feeler gauge -3- to check distance between outer friction lining and outer friction surface.
- Specification: minimum 0.2 mm.
- If specification is not met, renew magnetic clutch.



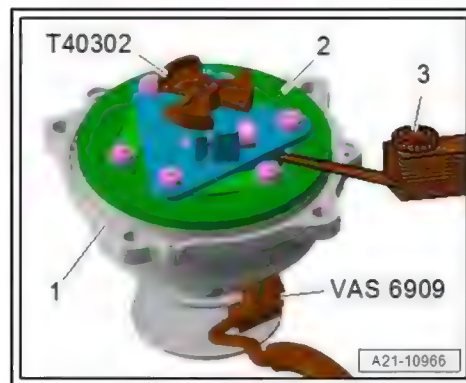
- Armature -2- must still be on magnetic clutch -1- and centring pin -T40302- must be tightened hand-tight.
- Connect external power supply unit for clutch for supercharger - VAS 6909- to a 12 Volt battery or to jump-start terminal of another vehicle.
- Connect electrical connector of adapter cable -VAS 6909- to magnetic clutch and switch on power supply to magnetic clutch.



#### Caution

*Risk of irreparable damage to magnetic clutch*

- ◆ *The magnetic clutch must not be connected to the power supply for longer than 15 minutes.*
- ◆ *The magnetic clutch heats up when current is applied.*



- With current applied, use feeler gauge -3- to check distance between clamping hub (shown in -blue-) and outer friction surface at point shown in illustration.
- Perform this measurement in all three positions of clamping hub.
- Specification: maximum 1.3 mm.
- If specification is exceeded, renew magnetic clutch.
- Switch off external power supply unit for clutch for supercharger - VAS 6909- .

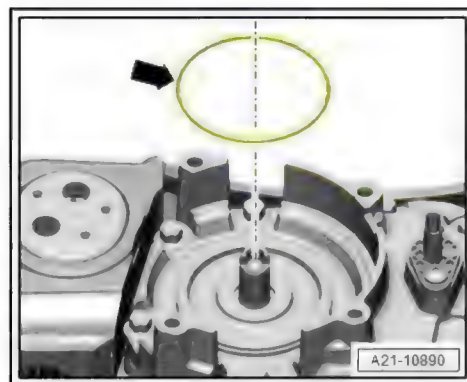
#### Installing



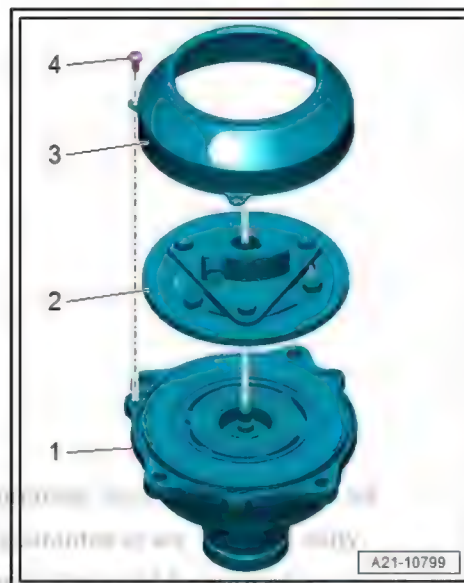
#### Note

*Renew O-ring after removal.*

- Insert O-ring -arrow- into groove on supercharger housing.



- Fit armature -2- onto magnetic clutch -1-.
- Fit trim -3- onto magnetic clutch and secure with three bolts -4-.

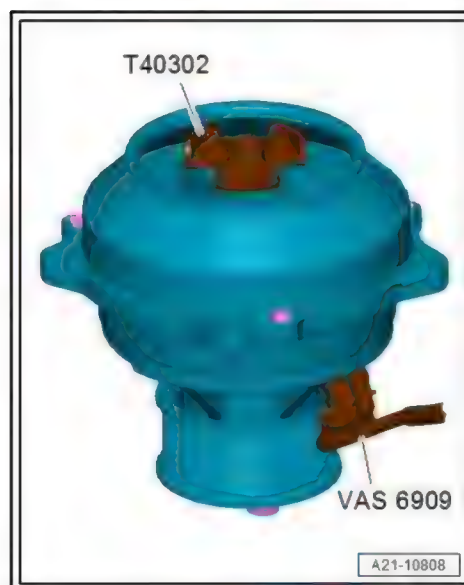


- Fit centring pin -T40302- into armature and magnetic clutch.
- Armature will be centred relative to magnetic clutch.
- Connect external power supply unit for clutch for supercharger - VAS 6909- to a 12 Volt battery or to jump-start terminal of another vehicle.
- Connect electrical connector of adapter cable -VAS 6909- to magnetic clutch and switch on power supply to magnetic clutch.
- Armature is fixed to magnetic clutch when power supply is switched on.



Note

- ◆ *It is important to ensure that the current to the magnetic clutch generated by the external power supply unit for clutch for supercharger - VAS 6909- is not interrupted during installation.*
- ◆ *The current to the magnetic clutch generated by the external power supply unit for clutch for supercharger - VAS 6909- may be disconnected only after the clamping bolt of the clamping hub is tightened on the shaft.*



Caution

*Risk of irreparable damage to magnetic clutch*

- ◆ *The magnetic clutch must not be connected to the power supply for longer than 15 minutes.*
- ◆ *The magnetic clutch heats up when current is applied.*

- Remove centring pin -T40302- with power supply switched on.

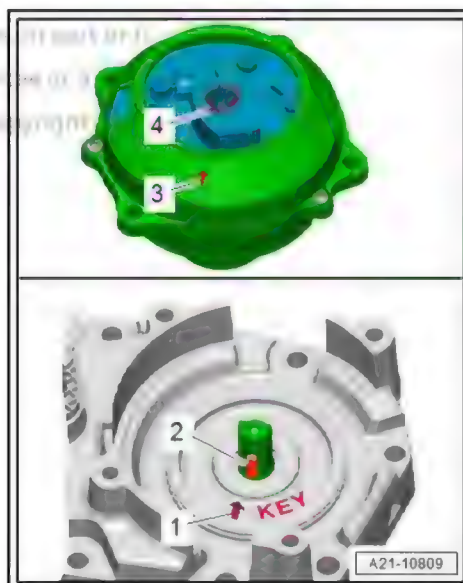
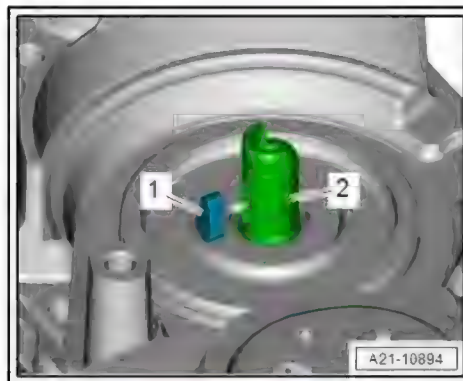


- Check that Woodruff key -1- is seated correctly in drive shaft -2--
- Drive shaft must be free of oil and grease

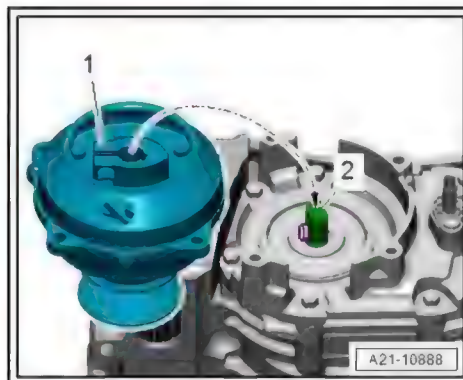


The following markings assist in aligning the armature of the magnetic clutch with the shaft of the supercharger:

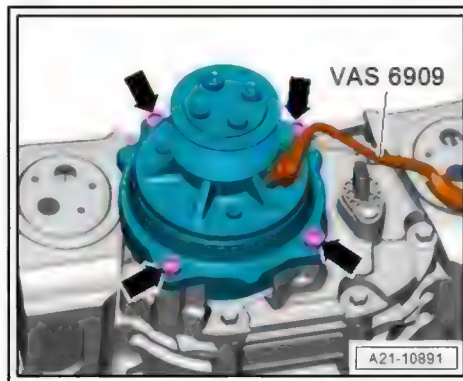
- Position armature of magnetic clutch so that groove -4- for Woodruff key is opposite arrow marking -3- on trim.
- Position shaft of supercharger so that Woodruff key -2- faces "KEY" marking -1-.



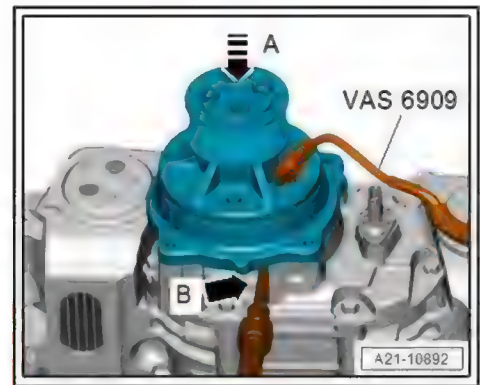
- Fit armature -1- of magnetic clutch onto shaft -2- of supercharger -arrow-.



- Fit magnetic clutch onto supercharger and tighten bolts -arrows- (keep power supply switched on).



- Press pulley downwards by hand towards supercharger  
 -arrow A- and at the same time tighten clamping bolt  
 -arrow B- (keep power supply switched on).
- Switch off power supply and disconnect external power supply unit for clutch for supercharger - VAS 6909- from magnetic clutch and from power source.
- Install coolant pipes on supercharger  
 ⇒ ["3.2.6 Removing and installing coolant pipes on supercharger", page 217](#) .
- Perform adaption for magnetic clutch after removing and installing/renewing:
  - Vehicle diagnostic tester must be connected.
  - Selecting operating mode.
  - Using **[Go To]** button and "Function/component selection" function, select the following in succession from tree:
    - ◆ 01 - Engine, self-diagnosis compatible systems
    - ◆ Functions
    - ◆ 01 - Compressor clutch adaption



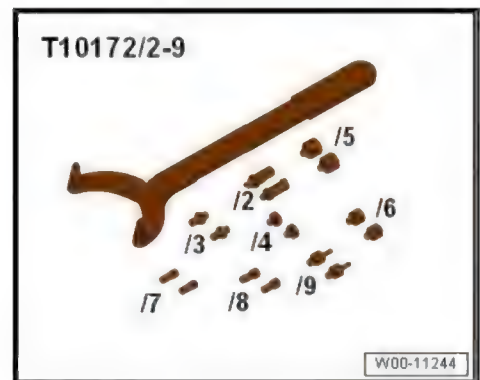
Tightening torques

- ◆ ⇒ ["1.2 Exploded view - magnetic clutch", page 242](#)

## 1.7 Removing and installing pulley for supercharger

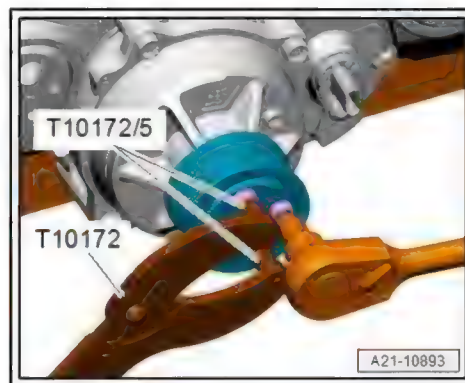
Special tools and workshop equipment required

- ◆ Counterhold tool - T10172 A- with adapters -T10172/5-



## Removing

- Remove engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#) .
- Remove poly V-belt for supercharger  
⇒ ["1.2.1 Removing and installing poly V-belt for supercharger", page 47](#) .
- Loosen two bolts for pulley by one turn; when doing so, counterhold the other two bolts with counterhold tool - T10172 A- and adapters -T10172/5- .
- Apply counterhold tool to loosened bolts and remove both other bolts.
- Remove remaining bolts and remove pulley.



## Installing

Installation is carried out in reverse order; note the following:

- Install poly V-belt for supercharger  
⇒ ["1.2.1 Removing and installing poly V-belt for supercharger", page 47](#) .
- Install engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#) .

## Tightening torques

- ◆ ⇒ ["1.2 Exploded view - magnetic clutch", page 242](#)

## 1.8 Removing and installing drive unit

### Special tools and workshop equipment required

- ◆ Used oil collection and extraction unit - VAS 6622A-



Illustrated by copyright. Copying for private or commercial purposes is not permitted unless authorized by Audi AG. Audi AG does not accept any liability for the correctness of the information in this document. Copyright by Audi AG.

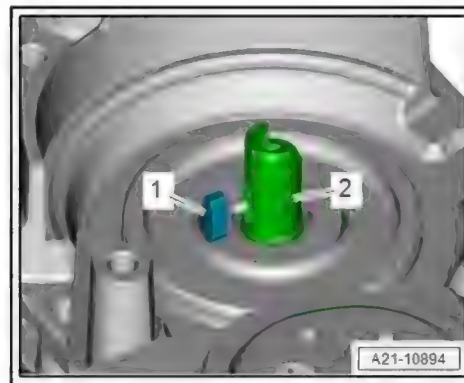


- ◆ Sealant ⇒ Electronic parts catalogue
- ◆ Oil for supercharger drive ⇒ Electronic parts catalogue
- ◆ Spreader tool (commercially available)

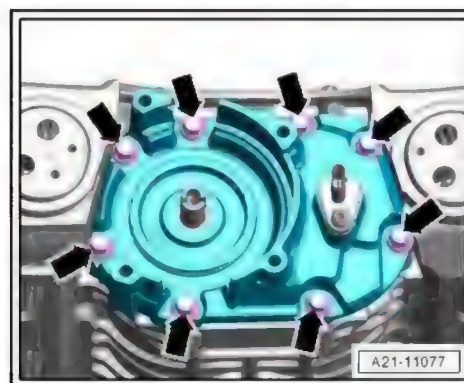
## Removing

- Supercharger secured to engine and gearbox support for assembly work  
⇒ ["1.11.1 Securing supercharger to engine and gearbox support for assembly work", page 269](#) .
- Remove magnetic clutch  
⇒ ["1.6 Removing and installing magnetic clutch", page 252](#) .
- Position supercharger vertically in engine and gearbox support.
- Drive unit faces upwards.

- Detach Woodruff key -1- from drive shaft -2-.



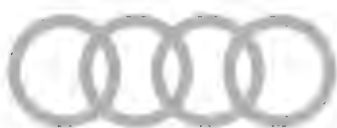
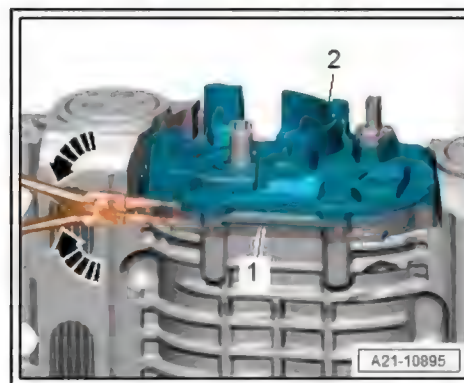
- Remove bolts -arrows-.



#### Caution

- ♦ *To make sure bearing cover -1- for rotor assembly does not come loose and remains properly sealed, always use spreader tool -arrows- to press off drive unit -2- as shown in illustration (do not use a hammer).*

- Using a spreader tool, carefully press off drive unit from bearing cover and detach.





- With the aid of used oil collection and extraction unit - VAS 6622A- , extract all oil for supercharger drive from bearing cover (including oil chambers -arrows- between ribs).

#### Installing



#### Note

- ◆ *Renew seal for drive unit after removal.*
- ◆ *Fit self-locking bolts or bolts with sealant → Electronic parts catalogue .*
- Clean surfaces; they must be free of oil and grease.
- Before assembly, always remove residues from threaded holes using a thread tap.
- Fill bearing cover with oil for supercharger drive.

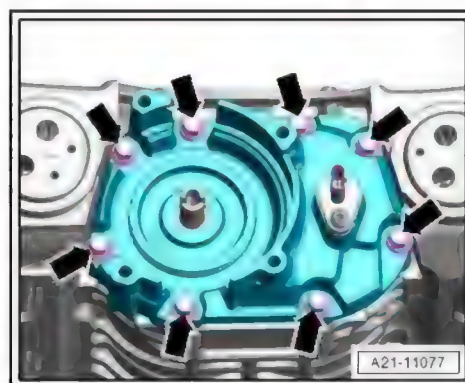
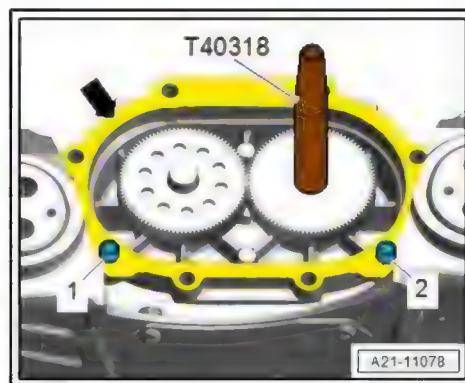
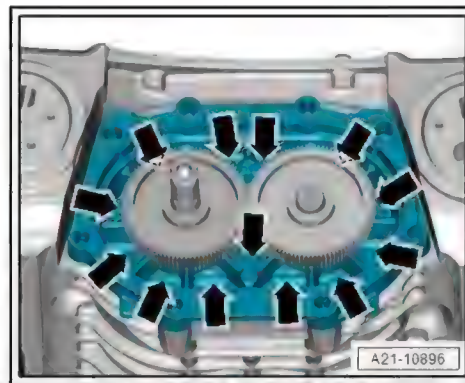


#### Note

*The container is filled with the required amount of oil. It is not possible to check the oil level at a later stage.*

- Apply a thin layer of sealant to sealing surface -arrow- for drive unit on rotor assembly and fit assembly sleeve - T40318- onto drive shaft, as shown in illustration.
- Fit drive unit with new seal onto rotor assembly (note position of dowel sleeves -1, 2-).

- Tighten bolts -arrows-.



– Fit Woodruff key -1- into drive shaft -2-.

– Install magnetic clutch

⇒ [“1.6 Removing and installing magnetic clutch”, page 252](#) .

Remaining installation steps are carried out in reverse sequence; note the following:

– Check supercharger for leaks

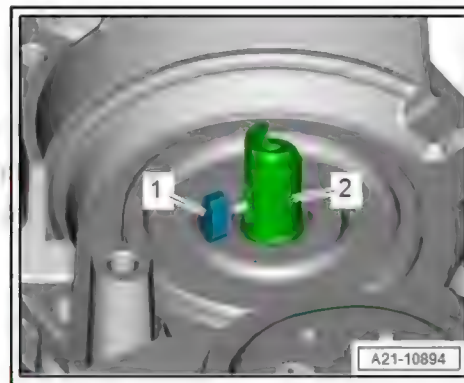
⇒ [“1.5 Checking supercharger for leaks”, page 250](#) .

– Install coolant pipes on supercharger

⇒ [“3.2.6 Removing and installing coolant pipes on supercharger”, page 217](#) .

Tightening torques

◆ ⇒ [“1.3 Exploded view - rotor assembly”, page 243](#)



## 1.9 Removing and installing rotor assembly

Special tools and workshop equipment required

◆ Internal puller - VAS 501 001- (not illustrated)

◆ Assembly tool -T40303-



Removing

• Supercharger secured to engine and gearbox support for assembly work  
⇒ [“1.11.1 Securing supercharger to engine and gearbox support for assembly work”, page 269](#) .

– Remove magnetic clutch

⇒ [“1.6 Removing and installing magnetic clutch”, page 252](#) .

– Remove drive unit

⇒ [“1.8 Removing and installing drive unit”, page 260](#) .

– Position supercharger vertically in engine and gearbox support.

• Spur gears of rotor assembly face upwards.

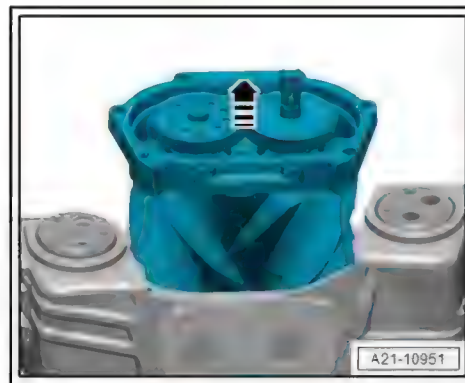
- Carefully detach rotor assembly upwards -arrow-, ensuring that rotors do not damage inner surfaces of supercharger housing.
- Set rotor module down carefully and ensure that it is kept free of dust.
- Block off air ducts with clean cloths to prevent dirt or small objects from dropping into supercharger housing.



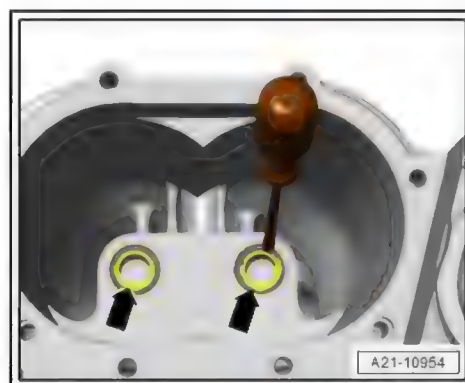
### Caution

*Risk of damage to surfaces of supercharger housing.*

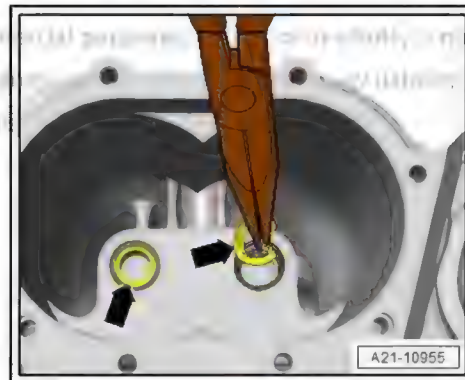
- ◆ *If necessary, use cloths to protect the surfaces of the supercharger housing during the following steps.*



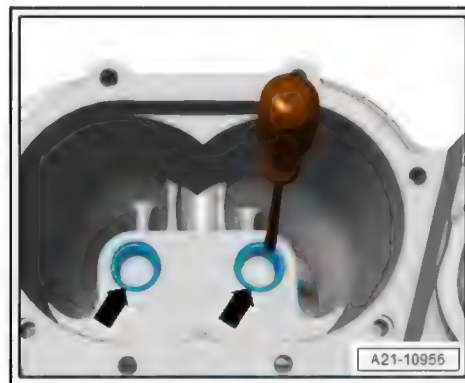
- Using a screwdriver, bend seals -arrows- of both rotor needle bearings inwards.



- Remove seals -arrows- of both rotor needle bearings with long-nose pliers.



- Break open needle bearing cages -arrows- of both bearings with a screwdriver.



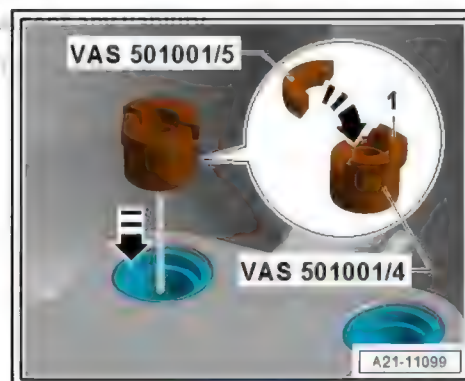
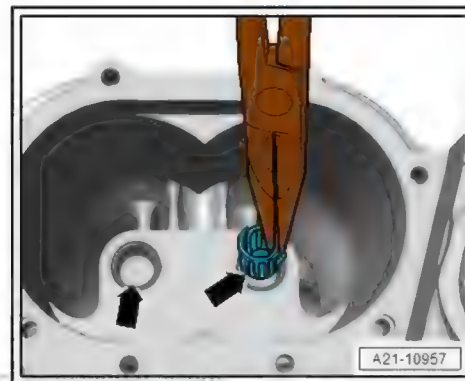
- Use long-nose pliers to remove needle bearing cages -arrows- of both bearings.
- Remove loose roller bearings completely using a magnet.



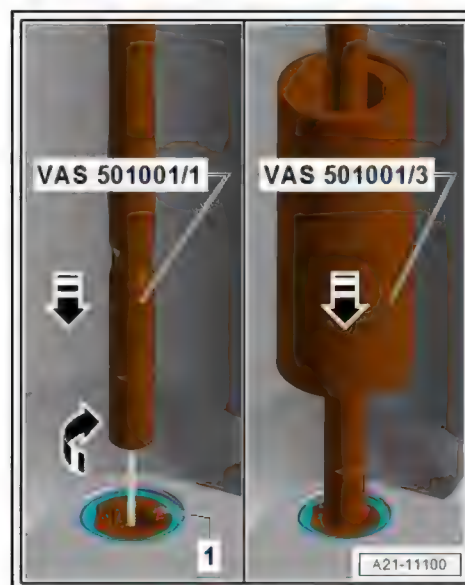
*(Protected by Copyright. Copying for private or commercial purposes is not permitted.)*

Insert threaded bush -VAS 501 001/4- into sleeve of needle bearing; ensure that collar -1- faces upwards.

- Place thrust washer -VAS 501 001/5- on threaded bush -VAS 501 001/4- with writing on tool facing upwards.



- Screw spindle -VAS 501 001/1- hand-tight into threaded bush -VAS 501 001/4- item 1- as far as it will go.
- Attach support sleeve -VAS 501 001/3- ; end with flat face must point downwards.



- Screw forcing nut -VAS 501 001/2- onto spindle.
- Position socket -VAS 501 001/6- on forcing nut.



Submitted by copyright. Copying for non-commercial purposes without express permission by title AG. All rights reserved. No warranties are made, expressed or implied, in this document.

- Pull out sleeve of needle bearing by turning socket -VAS 501 001/6- ; counterhold with suitable tool at spindle -VAS 501 001/1- .
- Pull out sleeve of second needle bearing in the same way.



## Installing

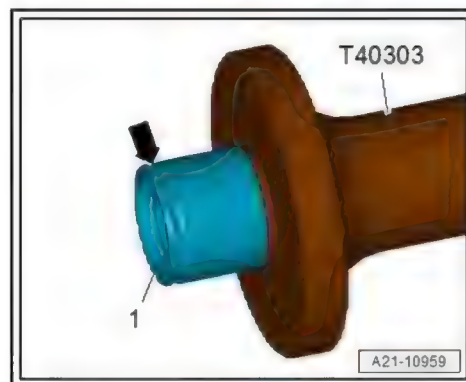
- Thoroughly clean bearing seats and contact surfaces for rotor assembly.
- Fit new needle bearing onto tool -T40303- .
- Groove -arrow- faces supercharger housing.
- Seal in needle bearing faces tool.



### Caution

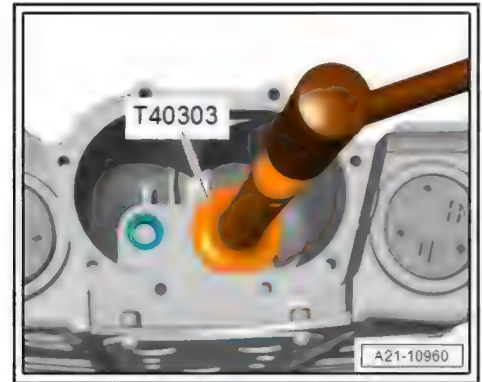
*Risk of diluting grease filling in needle bearing if too much engine oil is applied.*

- ◆ *Apply only a very thin layer of engine oil.*

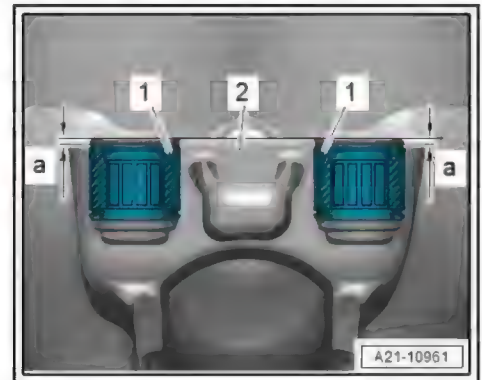


- Lightly lubricate outer circumference (sleeve) of needle bearing with engine oil.

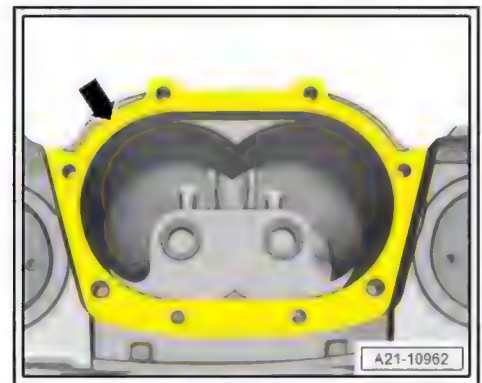
- Using assembly tool -T40303- , position needle bearing at hole in supercharger housing (ensure it is straight) and drive it in as far as stop with a large plastic hammer.



- Check seating of needle bearing -1- in supercharger housing -2- after driving needle bearing in:
  - Dimension -a- = 1.5 mm
- If necessary, drive needle bearing in further.



- Apply a thin layer of sealant -arrow- to sealing surface for rotor module on supercharger housing.
- Carefully fit rotor assembly in supercharger housing.
- Ensure that rotors do not damage inner surfaces of supercharger housing, and that rotor shafts are inserted into needle bearings.
- Install drive unit  
⇒ ["1.8 Removing and installing drive unit", page 260](#) .
- Install magnetic clutch  
⇒ ["1.6 Removing and installing magnetic clutch", page 252](#) .
- Check supercharger for leaks  
⇒ ["1.5 Checking supercharger for leaks", page 250](#) .



## 1.10 Renewing drive shaft oil seal

Special tools and workshop equipment required

- ◆ Pin - VW 295-



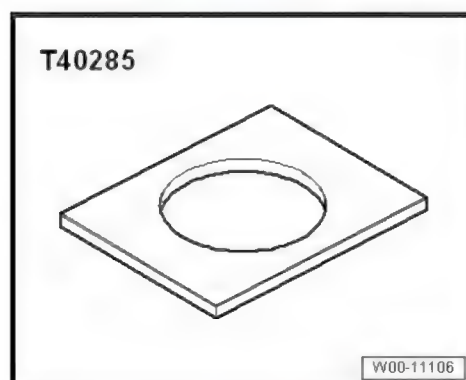
Copyright by Volkswagen Group of America. All rights reserved. This document is for informational purposes only. It is not intended to be used as a substitute for the original technical documentation. The information in this document is subject to change without notice. The information in this document is not intended to be used as a substitute for the original technical documentation. The information in this document is not intended to be used as a substitute for the original technical documentation.



# ◆ Sleeve - 3144-

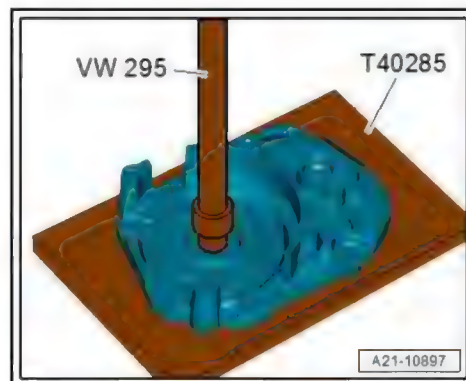


# ◆ Plate - T40285-

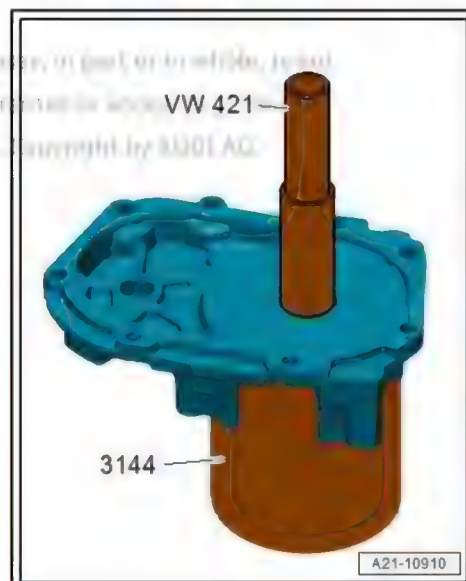


## Procedure

- Remove drive unit  
⇒ ["1.8 Removing and installing drive unit", page 260](#) .
- Place drive unit on plate - T40285- with front side facing upwards, as shown in illustration.
- Use drift - VW 295- to drive oil seal out of drive unit.



- Place drive unit on workbench with front side facing downwards.
- Drive in oil seal with sleeve - 3144-
- Installation position: Open side of oil seal faces tool.
- Install drive unit  
⇒ ["1.8 Removing and installing drive unit", page 260](#) .



## 1.11 Securing supercharger to engine and gearbox support

⇒ "1.11.1 Securing supercharger to engine and gearbox support for assembly work", page 269

⇒ "1.11.2 Securing supercharger to engine and gearbox support for leak test", page 270

### 1.11.1 Securing supercharger to engine and gearbox support for assembly work



#### Note

*When performing assembly work, the openings in the bottom of the supercharger housing make it possible for you to see and access the charge air coolers.*

Special tools and workshop equipment required

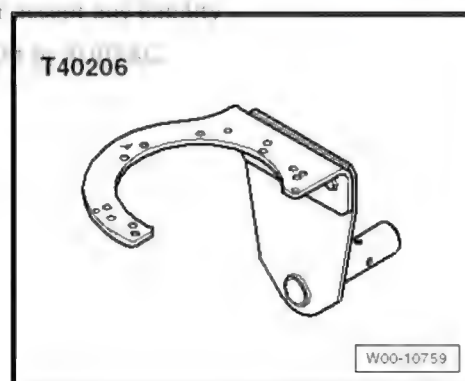
- ◆ Engine and gearbox support - VAS 6095-



Protected by copyright. Copying for private or commercial purposes is prohibited.

- ◆ Gearbox support - T40206- with -T40206/1-

With respect to the current version information in this document. Copyright © 2018 Audi AG.



- ◆ Mounting -T40304-



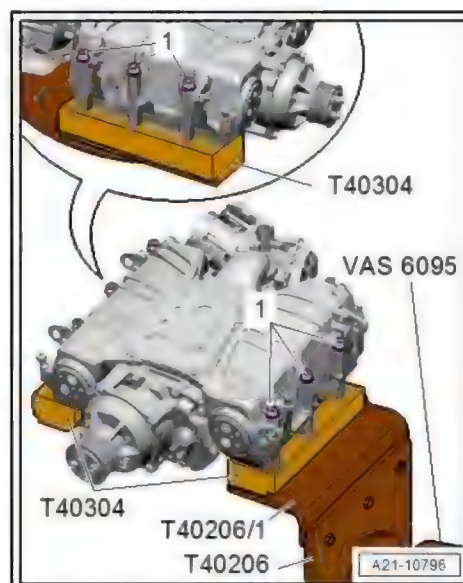
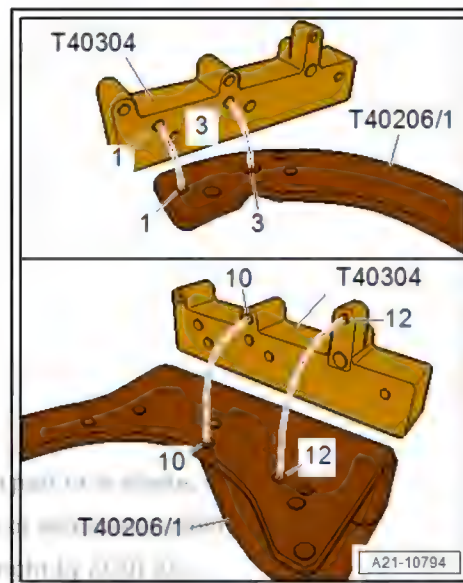
## Procedure

- Supercharger removed  
⇒ ["1.4 Removing and installing supercharger", page 244](#) .
- Insert gearbox support - T40206- with -T40206/1- into engine and gearbox support - VAS 6095- .
- Secure mounting -T40304- to -T40206/1- (only screw in bolts lightly at first), observing alignment of holes -1, 3, 10, 12- on mountings and gearbox support - T40206- .



Technische Zeichnung. Copyright der Audi AG. Alle Rechte vorbehalten. Die Audi AG ist nicht verantwortlich für die Verwendung der Informationen in diesem Dokument. Copyright by Audi AG.

- Place supercharger onto mounting -T40304- , as shown in illustration.
- Bottom openings in supercharger housing make it possible for you to see and access charge air coolers.
- Hand-tighten bolts -1- evenly in a diagonal sequence on both sides.
- Tighten bolts securing mounting -T40304- to -T40206/1- to 21 Nm.
- Tighten bolts -1- on both sides in diagonal sequence to 21 Nm.



## 1.11.2 Securing supercharger to engine and gearbox support for leak test



### Note

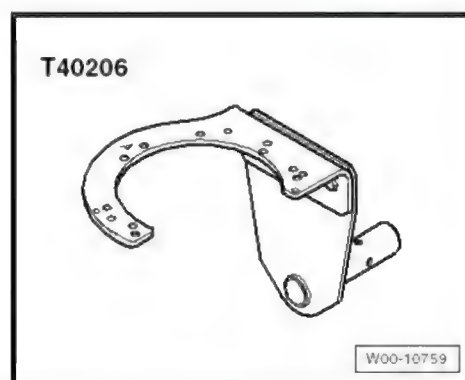
*When checking for leaks, the seals on the mountings -T40304- should seal off the openings in the supercharger housing.*

Special tools and workshop equipment required

◆ Engine and gearbox support - VAS 6095-



◆ Gearbox support - T40206- with -T40206/1-



◆ Mounting -T40304-

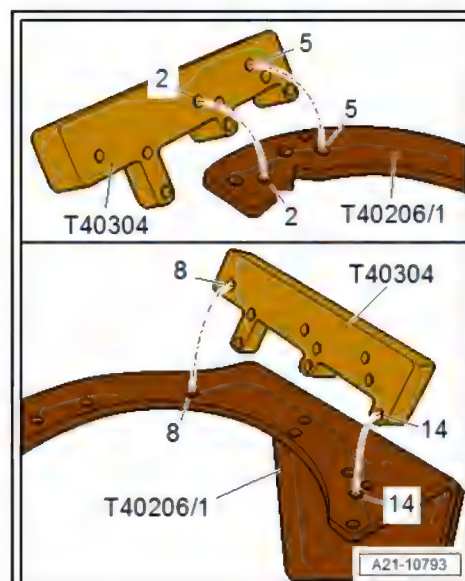


Imported by Audi AG. Copying for private or commercial use is prohibited unless authorized by Audi AG. Audi reserves all rights. All rights reserved. All information is subject to change without notice. Copyright by Audi AG.



Procedure

- Supercharger removed  
 ⇒ ["1.4 Removing and installing supercharger", page 244](#) .
- Insert gearbox support - T40206- with -T40206/1- into engine and gearbox support - VAS 6095- .
- Secure mounting -T40304- to -T40206/1- (only screw in bolts lightly at first), observing alignment of holes -2, 5, 8, 14- on mountings and gearbox support - T40206- .

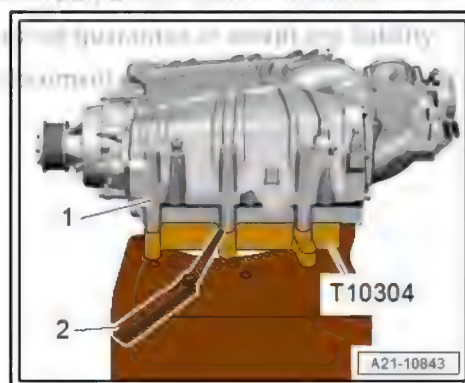
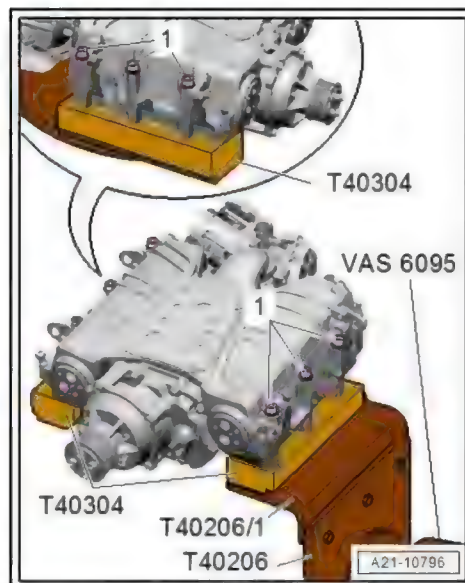


- Place supercharger onto mounting -T40304- , as shown in illustration.
- Seals of mountings should seal off openings in supercharger housing.
- Lightly hand-tighten bolts -1- evenly in a diagonal sequence on both sides.
- Tighten bolts securing mounting -T40304- to -T40206/1- to 21 Nm.



Protected by copyright. Copying for private or commercial use without the written permission of Audi AG is prohibited.

- Use a feeler gauge -2- to check that bolts are tightened evenly and adjust if necessary.
- There must be an even gap all around between supercharger -1- and mounting -T40304- .
- Maximum permissible deviation in gap dimension: 0.2 mm.



## 1.12 Removing and installing sender 1 for turbocharger speed - G688-

### Removing

- Remove engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel"](#),  
[page 43](#) .

- Unplug electrical connector -2-.
- Remove bolt -3- and detach sender 1 for turbocharger speed - G688-.

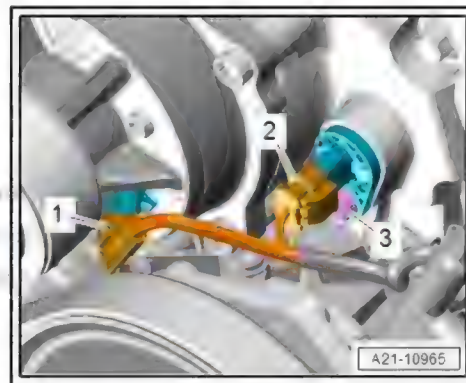


Note

*Disregard -item 1-.*

Installing

Installation is carried out in reverse order; note the following:



Note

*Renew seals.*

- Install engine cover panel  
 ⇒ ["3.1 Removing and installing engine cover panel", page 43](#).

Tightening torques

- ◆ ⇒ ["1.1 Exploded view - supercharger", page 239](#)

## 2 Charge air system

⇒ "2.1 Exploded view - charge air system", page 274

⇒ "2.2 Exploded view - hose connections for charge air system", page 275

⇒ "2.3 Removing and installing charge air cooler", page 275

⇒ "2.4 Removing and installing charge pressure sender G31 / G447", page 280

### 2.1 Exploded view - charge air system

#### 1 - Gasket

- ☐ Renew after removing

#### 2 - O-ring

- ☐ Renew after removing
- ☐ Coat with engine oil when installing charge air cooler

#### 3 - O-ring

- ☐ Renew after removing
- ☐ Coat with engine oil when installing charge air cooler

#### 4 - Gasket

- ☐ Renew after removing

#### 5 - Charge air cooler (right-side)

- ☐ Removing and installing  
⇒ "2.3 Removing and installing charge air cooler", page 275

#### 6 - Bolt

- ☐ Self-locking
- ☐ Renew after removing
- ☐ 10 Nm

#### 7 - Gasket

- ☐ Not supplied separately
- ☐ Must not be detached from charge air cooler
- ☐ Coat with engine oil when installing charge air cooler

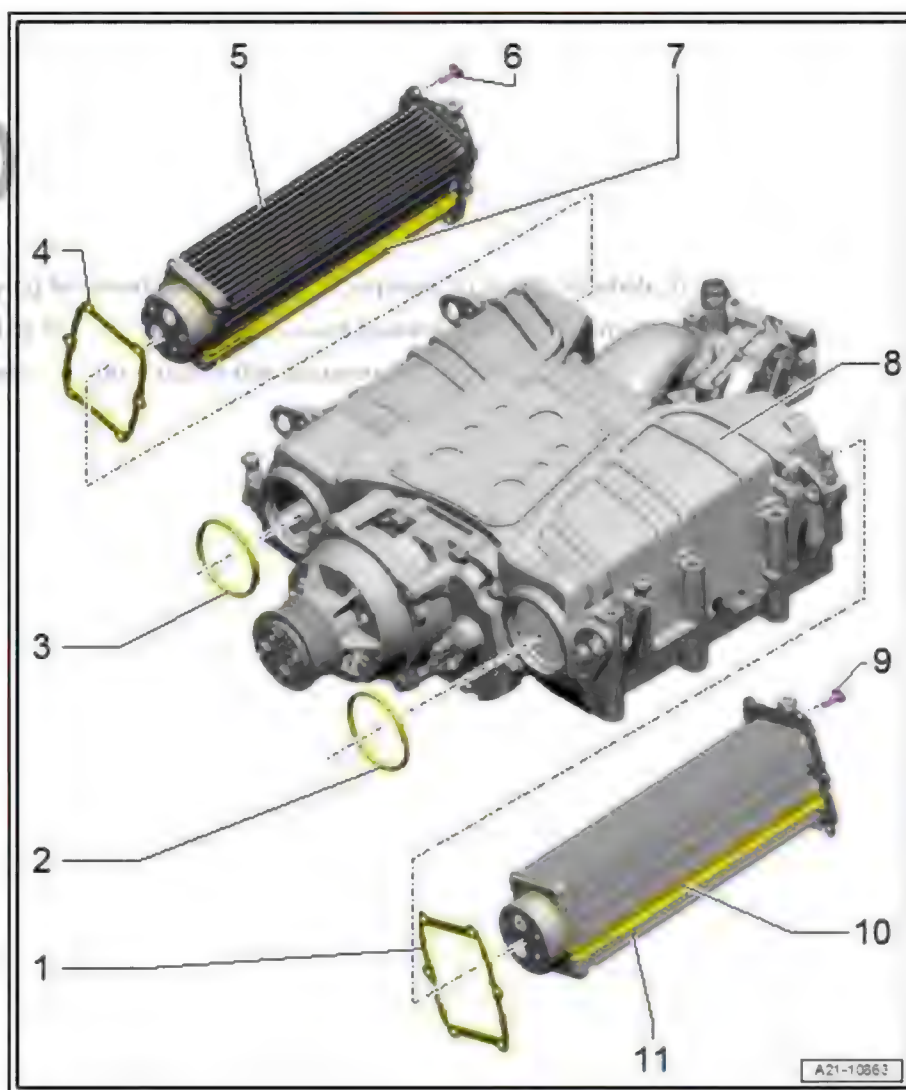
#### 8 - Supercharger housing

#### 9 - Bolt

- ☐ Self-locking
- ☐ Renew after removing
- ☐ 10 Nm

#### 10 - Gasket

- ☐ Not supplied separately
- ☐ Must not be detached from charge air cooler
- ☐ Coat with engine oil when installing charge air cooler



## 11 - Charge air cooler (left-side)

- ❑ Removing and installing ⇒ ["2.3 Removing and installing charge air cooler", page 275](#)

## 2.2 Exploded view - hose connections for charge air system

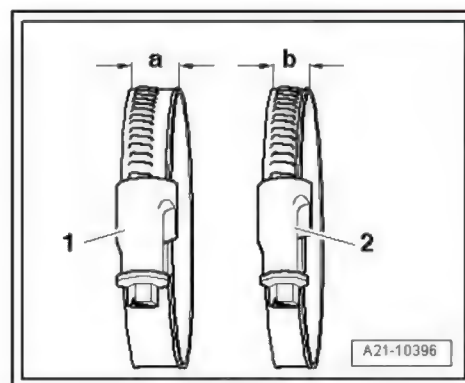


### Note

- ◆ *Hose connections and air pipes/hoses must be free of oil and grease prior to fitting.*
- ◆ *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*
- ◆ *The screw sections of used screw-type clips must be sprayed with rust remover prior to fitting so that the air hoses can be attached securely to the hose connections.*

Tightening torque for

- 1 - Hose clip with width -a- = 13 mm: 5.5 Nm
- 2 - Hose clip with width -b- = 9 mm: 3.4 Nm



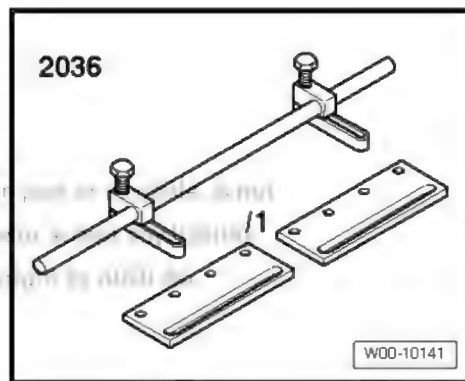
## 2.3 Removing and installing charge air cooler

Special tools and workshop equipment required

- ◆ Fitting sleeve - 2033-



# ◆ Assembly device for valves - 2036-



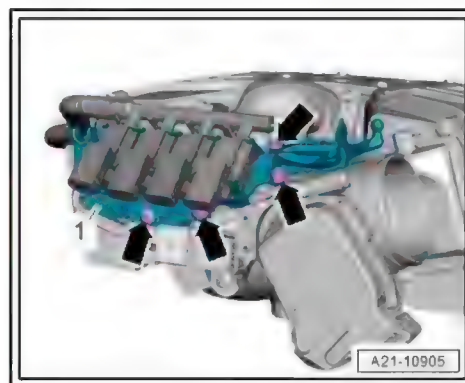
# ◆ Tyre lever for aluminium rims - V.A.G 1942-

## Removing

- Supercharger secured to engine and gearbox support - VAS 6095- for assembly work  
⇒ ["1.11.1 Securing supercharger to engine and gearbox support for assembly work", page 269](#) .
- Unscrew bolts -arrows- and detach bracket -1- with change-over valves.

## Charge air cooler (left-side):

- Remove charge pressure sender 2 - G447-  
⇒ ["2.4 Removing and installing charge pressure sender G31 / G447", page 280](#) .

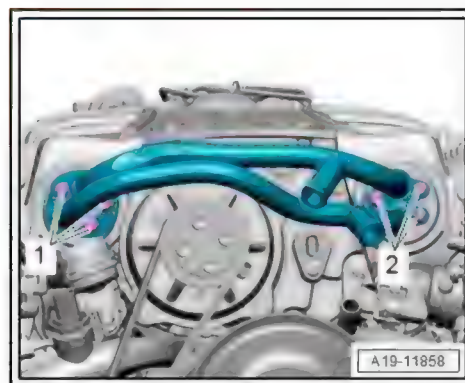


## Charge air cooler (right-side):

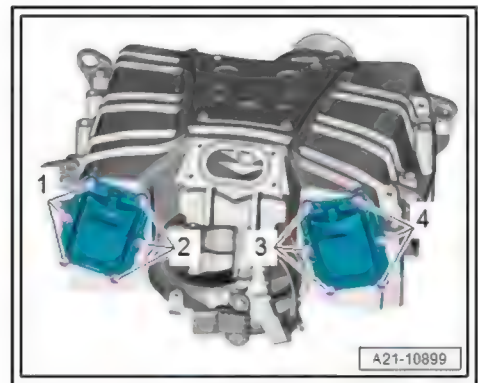
- Remove throttle valve module - J338-  
⇒ ["4.3 Removing and installing throttle valve module J338", page 301](#) .
- Remove charge pressure sender - G31-  
⇒ ["2.4 Removing and installing charge pressure sender G31 / G447", page 280](#) .

## Both sides (continued):

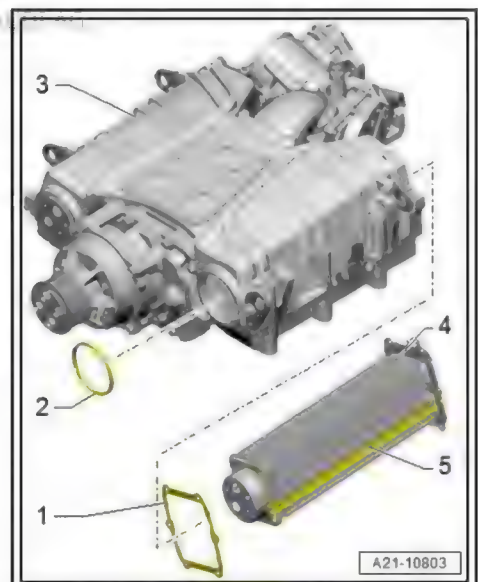
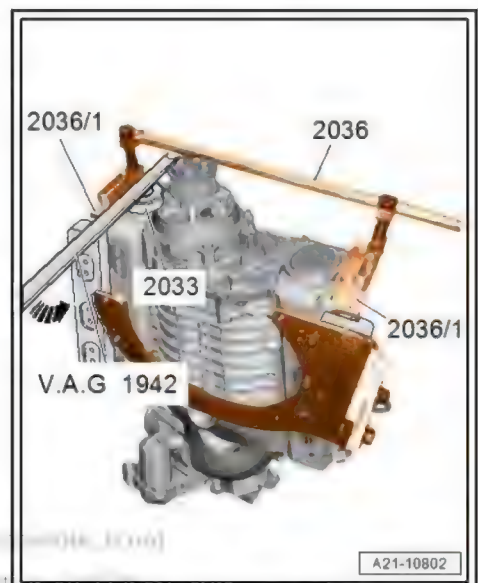
- Remove bolts -1- and -2- and detach coolant pipes from supercharger.



- Remove bolts -1, 2- for charge air cooler (left-side) and bolts -3, 4- for charge air cooler (right-side).



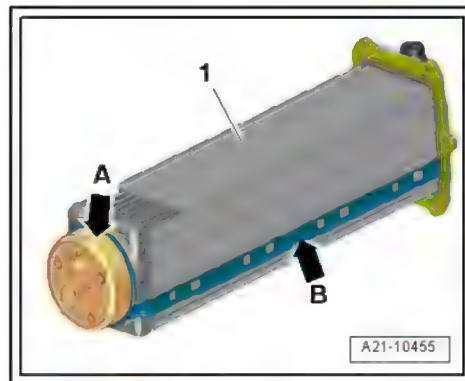
- Attach valve assembly device - 2036- with -2036/1- to supercharger, as shown in illustration.
- Apply fitting sleeve - 2033- at front of charge air cooler.
- Using tyre lever - V.A.G 1942- , apply moderate pressure and slowly press charge air cooler out of supercharger housing.



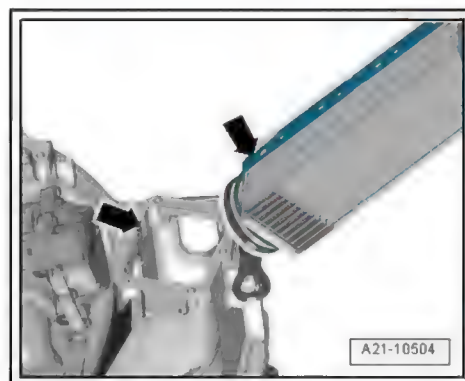
### Note

- ◆ *Renew gaskets, O-rings and self-locking bolts after removal.*
- ◆ *Before assembly, always remove residues from threaded holes in supercharger housing using a thread tap.*
- Check gasket -5- on charge air cooler -4-.
- The gasket must not be cracked or damaged.
- Slide gasket -1- onto charge air cooler.
- Insert O-ring -2- into opening in supercharger housing -3-.

- Coat sealing surface -arrow A- and gasket -arrow B- of charge air cooler -1- with engine oil.
- Also coat sealing surface inside supercharger housing with engine oil.



- When fitting charge air cooler, make sure that seals align with recesses in supercharger housing -arrows-.



#### Note

Protected by copyright. Copying for private use is permitted unless authorised by AUDI AG. All rights reserved.

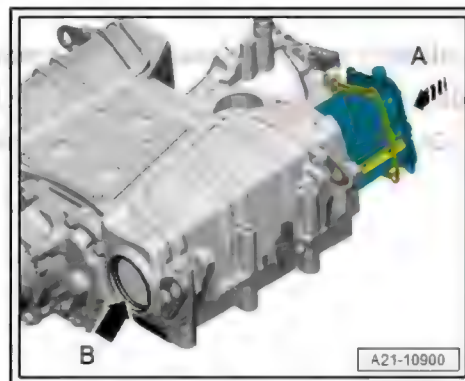
*To make it easier to insert and press in the charge air cooler, position the supercharger housing vertically in engine and gearbox support - VAS 6095-.*



#### Caution

*Risk of damage to charge air cooler.*

- ◆ *Only insert charge air cooler by hand.*



- Insert charge air cooler in supercharger housing -arrow A- by hand as far as stop, letting charge air cooler slide into hole -arrow B- in front of supercharger housing.

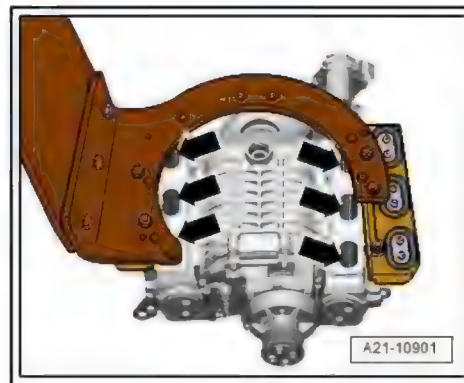
- If necessary, guide charge air cooler by hand via openings -arrows- in supercharger housing when inserting cooler.
- As soon as possible (due to length of bolts), screw in 2 bolts loosely by hand to guide charge air cooler additionally.



#### Caution

*Risk of damage to charge air cooler.*

- ◆ *The charge air cooler must not be pulled in by screwing in the securing bolts.*
- ◆ *Insert charge air cooler by hand (without using tools) until sealing flange with gasket makes contact with supercharger housing (maximum: 1 mm distance). Only then tighten bolts, as described in the following.*



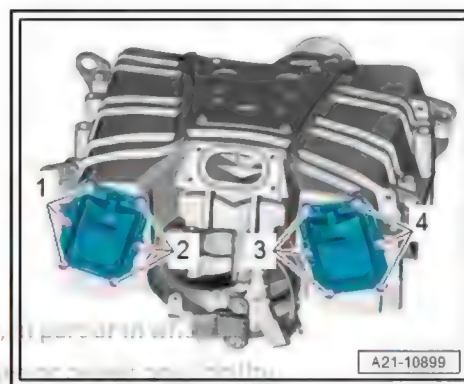
- Tighten bolts -1, 2- for charge air cooler (left-side) and bolts -3, 4- for charge air cooler (right-side) in diagonal sequence and in small steps.

Remaining installation steps are carried out in reverse sequence; note the following:

- Install coolant pipes on supercharger  
⇒ ["3.2.6 Removing and installing coolant pipes on supercharger", page 217](#).
- Install throttle valve module - J338-  
⇒ ["4.3 Removing and installing throttle valve module J338", page 301](#).
- Install charge pressure sender  
⇒ ["2.4 Removing and installing charge pressure sender G31 / G447", page 280](#).
- Check supercharger for leaks  
⇒ ["1.5 Checking supercharger for leaks", page 250](#).

Tightening torques

- ◆ ⇒ ["2.1 Exploded view - charge air system", page 274](#)



## 2.4 Removing and installing charge pressure sender -G31- / -G447-

### Removing

- Remove supercharger  
⇒ ["1.4 Removing and installing supercharger", page 244](#) .
- Unscrew bolt -2- and detach charge pressure sender -G31- or -G447- -item 1-.

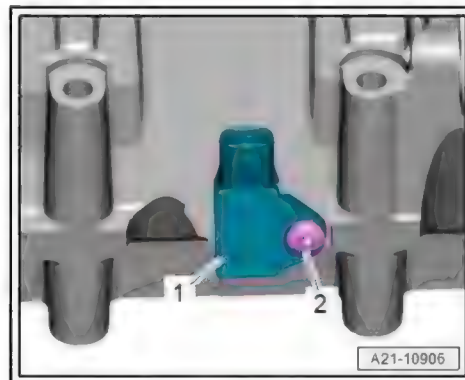
### Installing

Installation is carried out in reverse order; note the following:



#### Note

- ◆ *Renew self-locking bolts and O-ring after removal.*
  - ◆ *Before assembly, always remove residues from threaded holes for charge pressure senders in supercharger housing using a thread tap.*
  - Install supercharger  
⇒ ["1.4 Removing and installing supercharger", page 244](#) .
- Tightening torques**
- ◆ ⇒ ["1.1 Exploded view - supercharger", page 239](#)



Produced by ingemot, Germany for private commercial purposes, in part or in whole. Is not permitted unless authorized by AUDI AG. AUDI AG does not guarantee or accept responsibility with regard to the correctness of the information in this document. Copyright by AUDI AG.

## 24 – Mixture preparation - injection

### 1 Injection system

⇒ ["1.1 Overview of fitting locations - injection system", page 281](#)

⇒ ["1.2 Checking fuel system for leaks", page 288](#)

#### 1.1 Overview of fitting locations - injection system

Fitting locations in engine compartment

1 - Intake manifold flap potentiometer - G336-

- ❑ Exploded view  
⇒ ["4.1 Exploded view - intake manifold \(bottom section\) with fuel rail", page 295](#)

2 - Secondary air pump motor - V101-

- ❑ Exploded view  
⇒ ["3.1 Exploded view - secondary air system", page 354](#)

3 - Activated charcoal filter solenoid valve 1 - N80-

4 - Crankcase breather shut-off valve - N548-

- ❑ Exploded view  
⇒ ["3.1 Exploded view - crankcase breather system", page 167](#)

5 - Coolant circulation pump - V50-

- ❑ Fitting location  
⇒ [Fig. "Fitting location of coolant circulation pump -V50- """, page 283](#)
- ❑ Exploded view  
⇒ ["2.2 Exploded view - electric coolant pump", page 194](#)

6 - Brake servo pressure sensor - G294-

- ❑ Removing and installing  
⇒ Brake system; Rep. gr. 47 ; Vacuum system; Removing and installing brake servo pressure sensor

7 - Accelerator position sender - G79- and accelerator position sender 2 - G185-

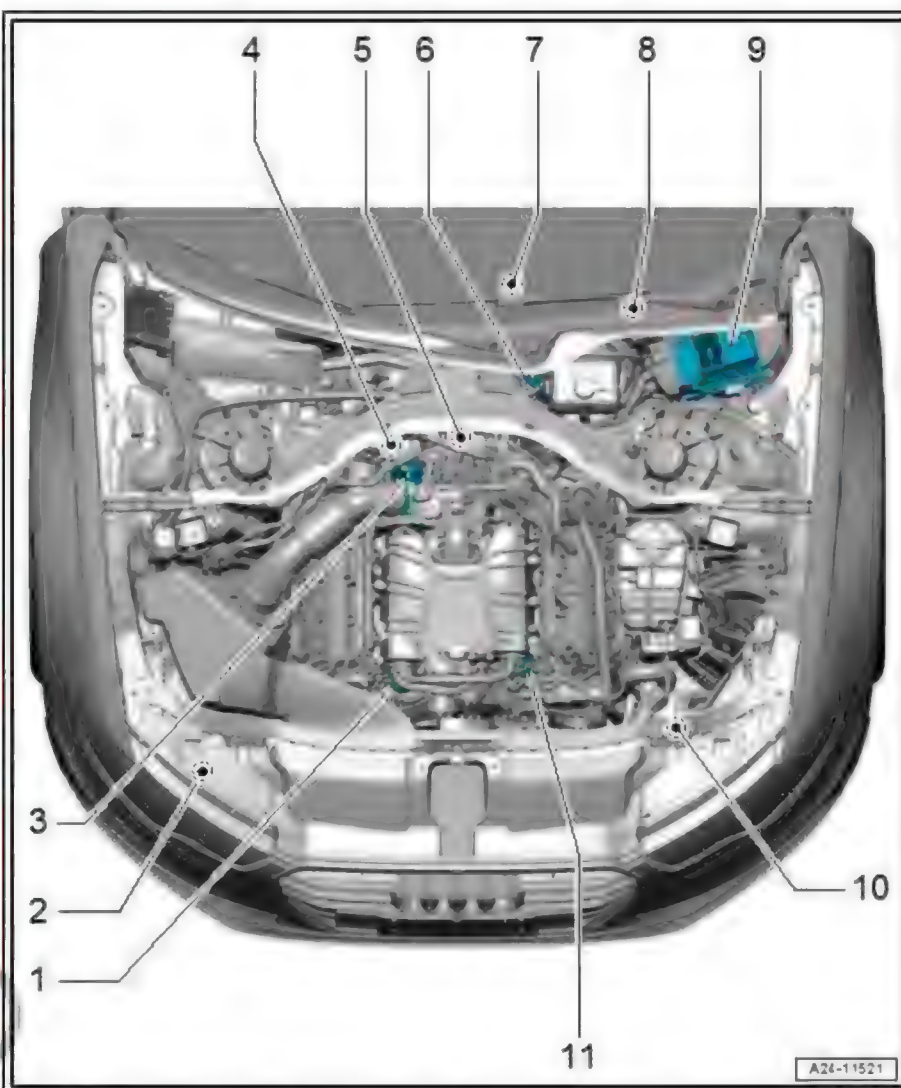
- ❑ Fitting location  
⇒ [Fig. "Fitting location of accelerator position sender -G79- / accelerator position sender 2 -G185- """, page 282](#)

8 - Brake light switch - F-

- ❑ Fitting location ⇒ [Fig. "Fitting location of brake light switch -F- """, page 282](#)

9 - Engine control unit - J623-

- ❑ Removing and installing ⇒ ["9.1 Removing and installing engine/motor control unit J623 ", page 334](#)



## 10 - Charge air cooling pump - V188-

- ❑ Fitting location ⇒ [Fig. "Fitting location of charge air cooling pump -V188- "" , page 283](#)
- ❑ Exploded view ⇒ ["2.2 Exploded view - electric coolant pump", page 194](#)

## 11 - Intake manifold flap potentiometer 2 - G512-

- ❑ Exploded view ⇒ ["4.1 Exploded view - intake manifold \(bottom section\) with fuel rail", page 295](#)

## Fitting location of accelerator position sender - G79- / accelerator position sender 2 - G185-

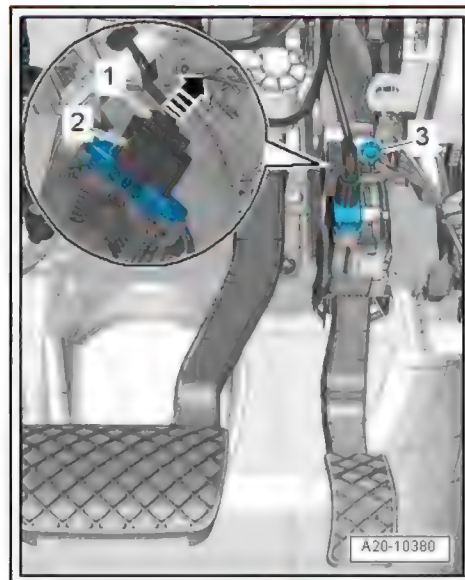
- ◆ In accelerator pedal module



### Note

*The accelerator position sender - G79- and accelerator position sender 2 - G185- are integrated in the accelerator pedal module and cannot be renewed individually.*

Removing and installing ⇒ Fuel supply system; Rep. gr. 20 ; Accelerator mechanism; Removing and installing accelerator pedal module with accelerator position sender -G79- / -G185-

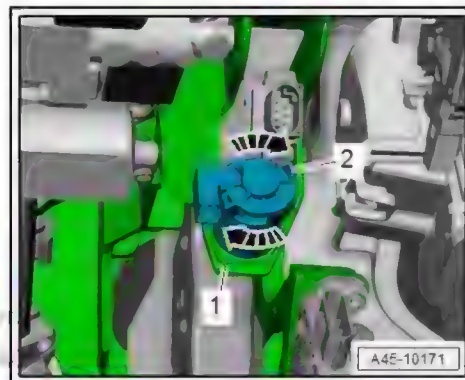


## Fitting location of brake light switch - F-

- ◆ In footwell on brake pedal

## 2 - Brake light switch - F-

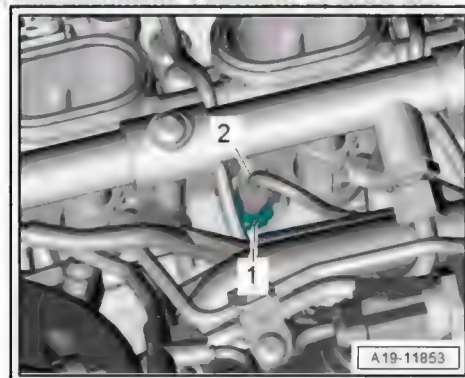
Removing and installing ⇒ Brake system; Rep. gr. 45 ; Sensors; Removing and installing brake light switch



## Fitting location of temperature sender for engine temperature regulation - G694-

- ◆ -Item 1- below intake manifold (bottom section) on cylinder bank 1 (right-side)

Removing and installing ⇒ [page 202](#)



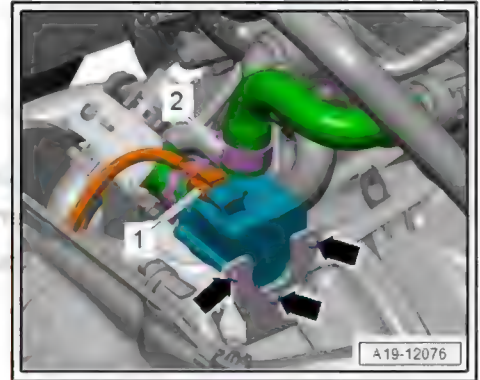
Fitting location of coolant circulation pump - V50-

◆ On top of gearbox housing

1 - Electrical connector for coolant circulation pump - V50-

Removing and installing

⇒ ["2.4.1 Removing and installing coolant circulation pump V50"](#), page 195



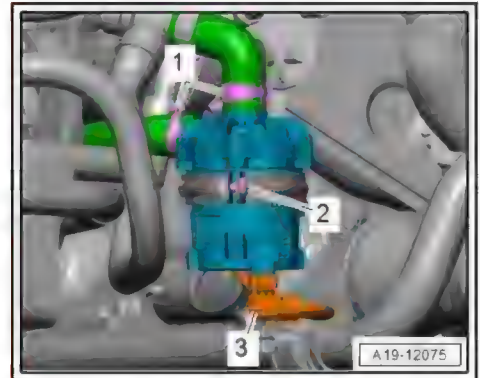
Fitting location of charge air cooling pump - V188-

◆ Beneath longitudinal member (front left)

3 - Electrical connector for charge air cooling pump - V188-

Removing and installing

⇒ ["2.4.2 Removing and installing charge air cooling pump V188"](#), page 197



Fitting locations on engine (from above)

1 - Ignition coils with output stages for cylinder bank 1

◆ Ignition coil 1 with output stage - N70-

◆ Ignition coil 2 with output stage - N127-

◆ Ignition coil 3 with output stage - N291-

□ Exploded view  
⇒ ["1.1 Exploded view - ignition system", page 375](#)

2 - Exhaust camshaft control valve 1 - N318-

□ Exploded view  
⇒ ["4.1 Exploded view - valve gear", page 129](#)

3 - Camshaft control valve 1 - N205-

□ Exploded view  
⇒ ["4.1 Exploded view - valve gear", page 129](#)

4 - FSI injectors

◆ Injector, cylinder 1 - N30-

◆ Injector, cylinder 2 - N31-

◆ Injector, cylinder 3 - N32-

□ Exploded view  
⇒ ["5.1 Exploded view - fuel rail with injectors", page 305](#)

5 - Knock sensor 1 - G61-

□ Exploded view  
⇒ ["1.1 Exploded view - ignition system", page 375](#)

6 - Knock sensor 2 - G66-

□ Exploded view ⇒ ["1.1 Exploded view - ignition system", page 375](#)

7 - Oil pressure switch - F22-

□ Exploded view ⇒ ["4.1 Exploded view - oil filter", page 172](#)

8 - Oil pressure switch for reduced oil pressure - F378-

□ Exploded view ⇒ ["4.1 Exploded view - oil filter", page 172](#)

9 - FSI injectors

◆ Injector, cylinder 4 - N33-

◆ Injector, cylinder 5 - N83-

◆ Injector, cylinder 6 - N84-

□ Exploded view ⇒ ["5.1 Exploded view - fuel rail with injectors", page 305](#)

10 - Camshaft control valve 2 - N208-

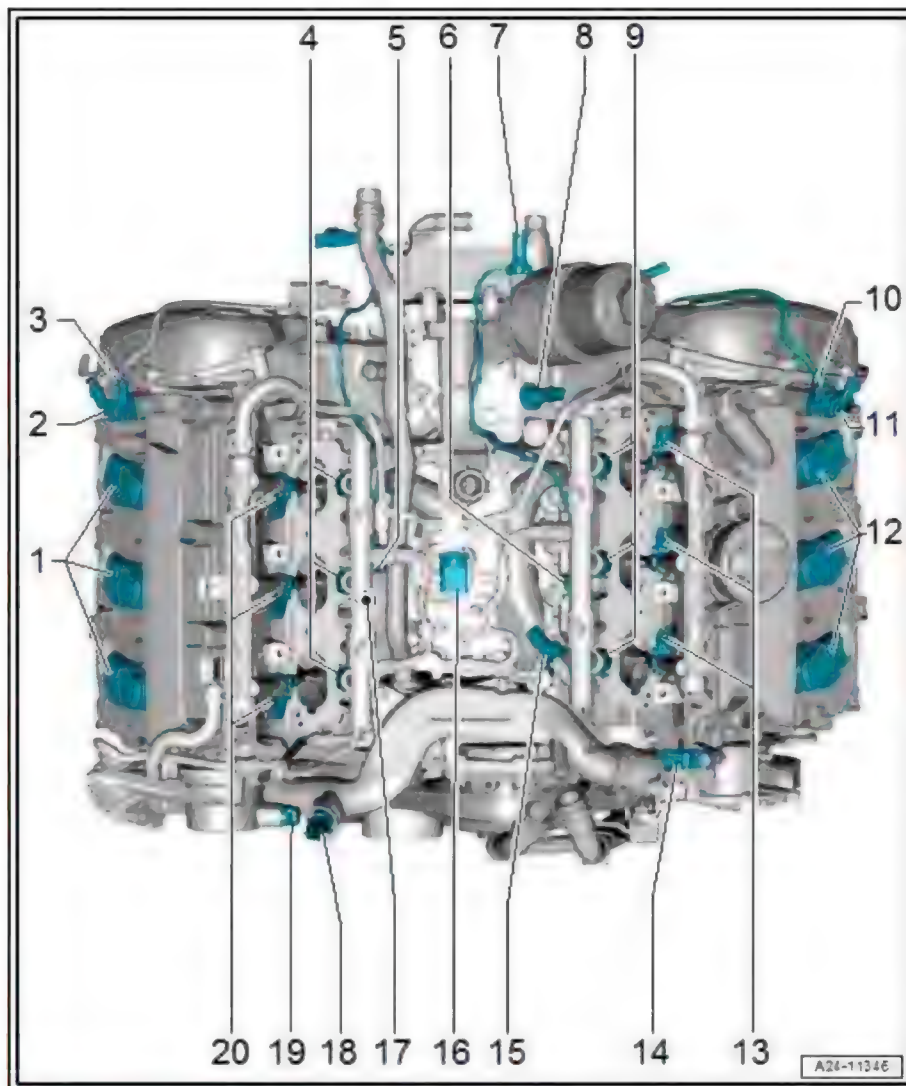
□ Exploded view ⇒ ["4.1 Exploded view - valve gear", page 129](#)

11 - Exhaust camshaft control valve 2 - N319-

□ Exploded view ⇒ ["4.1 Exploded view - valve gear", page 129](#)

12 - Ignition coils with output stages for cylinder bank 2

◆ Ignition coil 4 with output stage - N292-



◆ Ignition coil 5 with output stage - N323-

◆ Ignition coil 6 with output stage - N324-

□ Exploded view ⇒ ["1.1 Exploded view - ignition system", page 375](#)

### 13 - MPI injectors

◆ Injector 2, cylinder 4 - N535-

◆ Injector 2, cylinder 5 - N536-

◆ Injector 2, cylinder 6 - N537-

◆ Exploded view ⇒ ["4.1 Exploded view - intake manifold \(bottom section\) with fuel rail", page 295](#)

### 14 - Hall sender 2 - G163-

□ Exploded view ⇒ ["1.1 Exploded view - ignition system", page 375](#)

### 15 - Fuel pressure sender - G247-

□ Exploded view ⇒ ["5.1 Exploded view - fuel rail with injectors", page 305](#)

### 16 - Fuel pressure sender for low pressure - G410-

### 17 - Temperature sender for engine temperature regulation - G694-

□ Fitting location

⇒ [Fig. "Fitting location of temperature sender for engine temperature regulation -G694- """, page 282](#)

### 18 - Coolant temperature sender - G62-

□ Exploded view ⇒ ["2.3 Exploded view - coolant temperature senders", page 195](#)

### 19 - Hall sender - G40-

□ Exploded view ⇒ ["1.1 Exploded view - ignition system", page 375](#)

### 20 - MPI injectors

◆ Injector 2, cylinder 1 - N532-

◆ Injector 2, cylinder 2 - N533-

◆ Injector 2, cylinder 3 - N534-

◆ Exploded view ⇒ ["4.1 Exploded view - intake manifold \(bottom section\) with fuel rail", page 295](#)

Fitting locations on engine (from left side)



Provided by supplier. Copying for private, non-commercial purposes, or for internal use, is permitted unless authorized by AUDI AG. AUDI AG does not guarantee, except any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

#### 1 - Hall sender 4 - G301-

- ❑ Exploded view  
⇒ ["1.1 Exploded view - ignition system", page 375](#)

#### 2 - Lambda probe 2 after catalytic converter - G131-

- ❑ With Lambda probe 2 heater after catalytic converter - Z30-
- ❑ Exploded view  
⇒ ["8.1 Exploded view - Lambda probe", page 329](#)

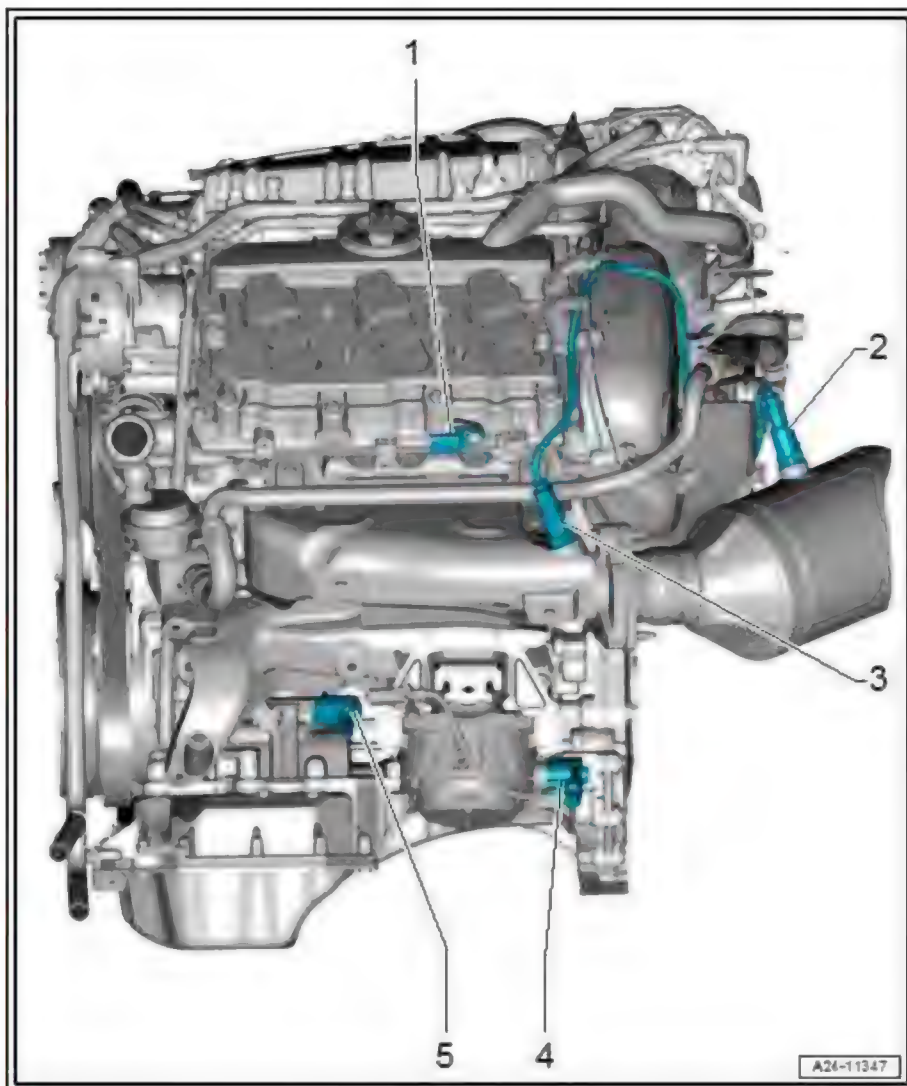
#### 3 - Lambda probe 2 - G108-

- ❑ With Lambda probe heater 2 - Z28-
- ❑ Exploded view  
⇒ ["8.1 Exploded view - Lambda probe", page 329](#)

#### 4 - Left electrohydraulic engine mounting solenoid valve - N144-

#### 5 - Valve for oil pressure control - N428-

- ❑ Exploded view  
⇒ ["4.2 Exploded view - oil pressure switches/oil pressure control", page 173](#)



Fitting locations on engine (from right side)



Protected by copyright. Copying for private or commercial purposes, in particular for advertising, is prohibited unless authorized by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information. 100% Recycled Paper by AUDI AG.

1 - Engine speed sender - G28-

- ❑ Exploded view  
⇒ ["1.1 Exploded view - ignition system", page 375](#)

2 - Lambda probe after catalytic converter - G130-

- ❑ With Lambda probe 1 heater after catalytic converter - Z29-
- ❑ Exploded view  
⇒ ["8.1 Exploded view - Lambda probe", page 329](#)

3 - Lambda probe - G39-

- ❑ With Lambda probe heater - Z19-
- ❑ Exploded view  
⇒ ["8.1 Exploded view - Lambda probe", page 329](#)

4 - Hall sender 3 - G300-

- ❑ Exploded view  
⇒ ["1.1 Exploded view - ignition system", page 375](#)

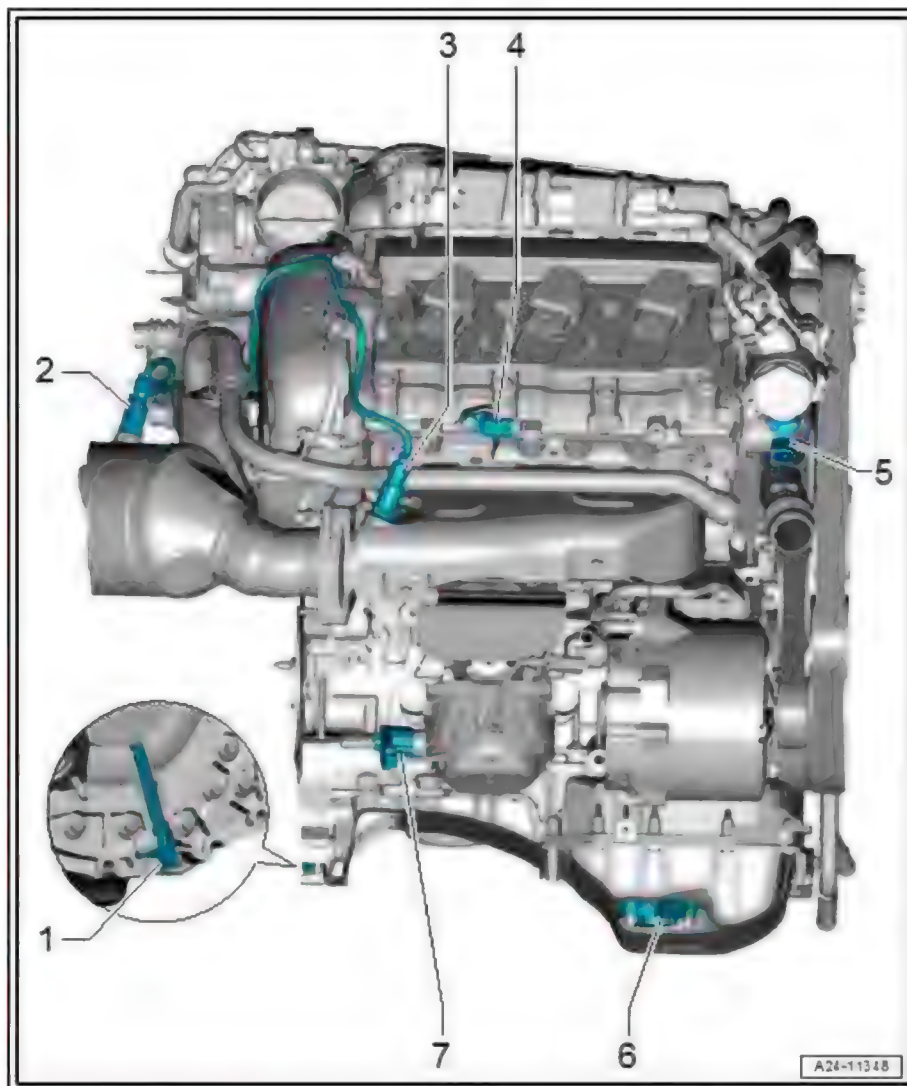
5 - Fuel metering valve - N290-

- ❑ Exploded view  
⇒ ["7.1 Exploded view - high-pressure pump", page 321](#)

6 - Oil level and oil temperature sender - G266-

- ❑ Exploded view  
⇒ ["1.1 Exploded view - sump/oil pump", page 155](#)

7 - Right electrohydraulic engine mounting solenoid valve - N145-



Fitting locations on supercharger



Protected by copyright. Copying (in particular for commercial purposes) in whole or in part is not permitted unless authorized by ADI AG. ADI AG does not guarantee or accept any liability for information or information in this document. Copyright by ADI AG.

1 - Magnetic clutch for supercharger - N421-

⇒ ["1.1 Exploded view - supercharger", page 239](#)

2 - Charge pressure sender - G31-

⇒ ["1.1 Exploded view - supercharger", page 239](#)

3 - Throttle valve module - J338-

- ❑ Including throttle valve drive for electric throttle - G186-, throttle valve drive angle sender 1 for electric throttle - G187- and throttle valve drive angle sender 2 for electric throttle - G188-

- ❑ Exploded view ⇒ ["1.1 Exploded view - supercharger", page 239](#)

4 - Coolant valve for cylinder head - N489-

5 - Solenoid for coolant circuit - N492-

6 - Intake manifold flap valve - N316-

7 - Secondary air inlet valve - N112-

8 - Intake air temperature sender - G42- / intake manifold pressure sender - G71-

- ❑ Exploded view ⇒ ["1.1 Exploded view - supercharger", page 239](#)

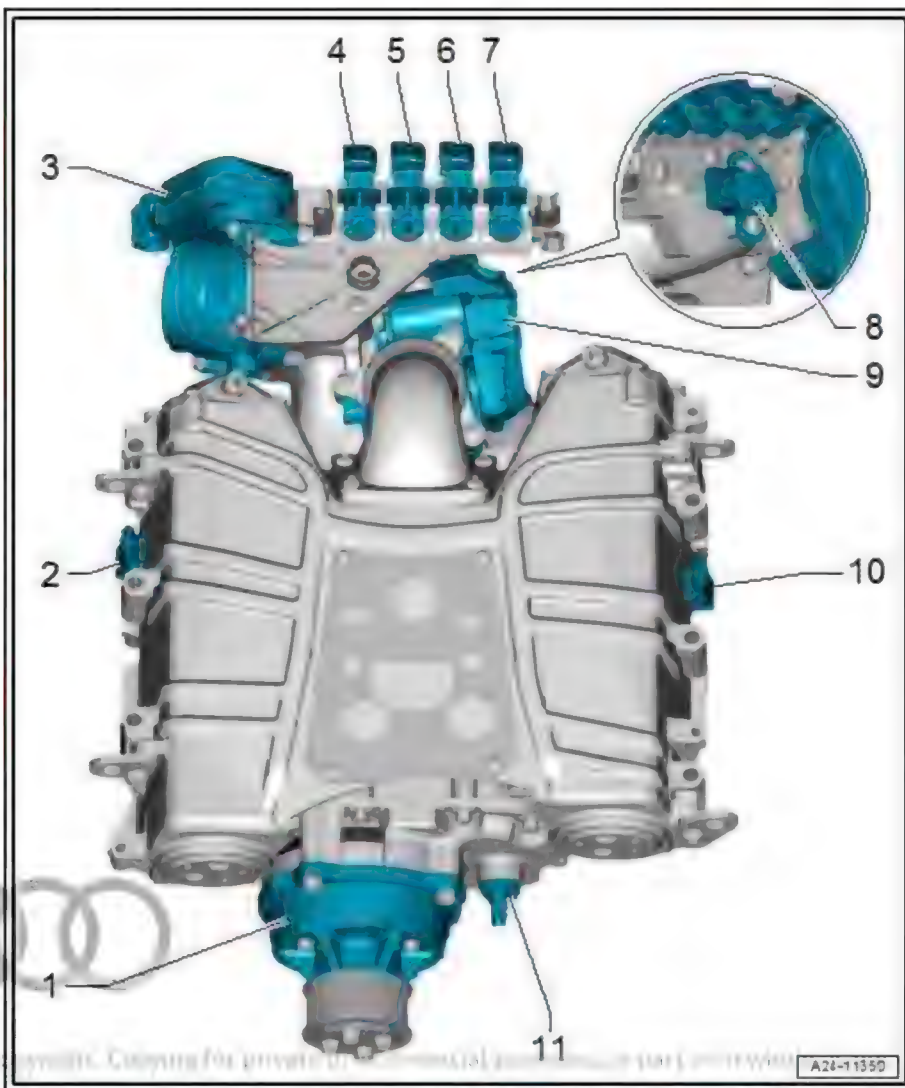
9 - Regulating flap control unit - J808-

- ❑ With regulating flap position control motor - V380- and regulating flap potentiometer - G584-

10 - Charge pressure sender 2 - G447-

- ❑ Exploded view ⇒ ["1.1 Exploded view - supercharger", page 239](#)

11 - Sender 1 for turbocharger speed - G688-



## 1.2 Checking fuel system for leaks


- Allow engine to run for several minutes at moderate rpm.
- Switch off ignition.
- Check complete fuel system for leaks.
- If leaks are found although the connections have been tightened to the correct torque, the relevant component must be renewed.
- Road-test vehicle and accelerate with full throttle at least once.
- Then check high-pressure system again for leaks.

## 2 Vacuum system

⇒ "2.1 Connection diagram - vacuum system", page 289

⇒ "2.2 Checking vacuum system", page 290

### 2.1 Connection diagram - vacuum system

**Caution**

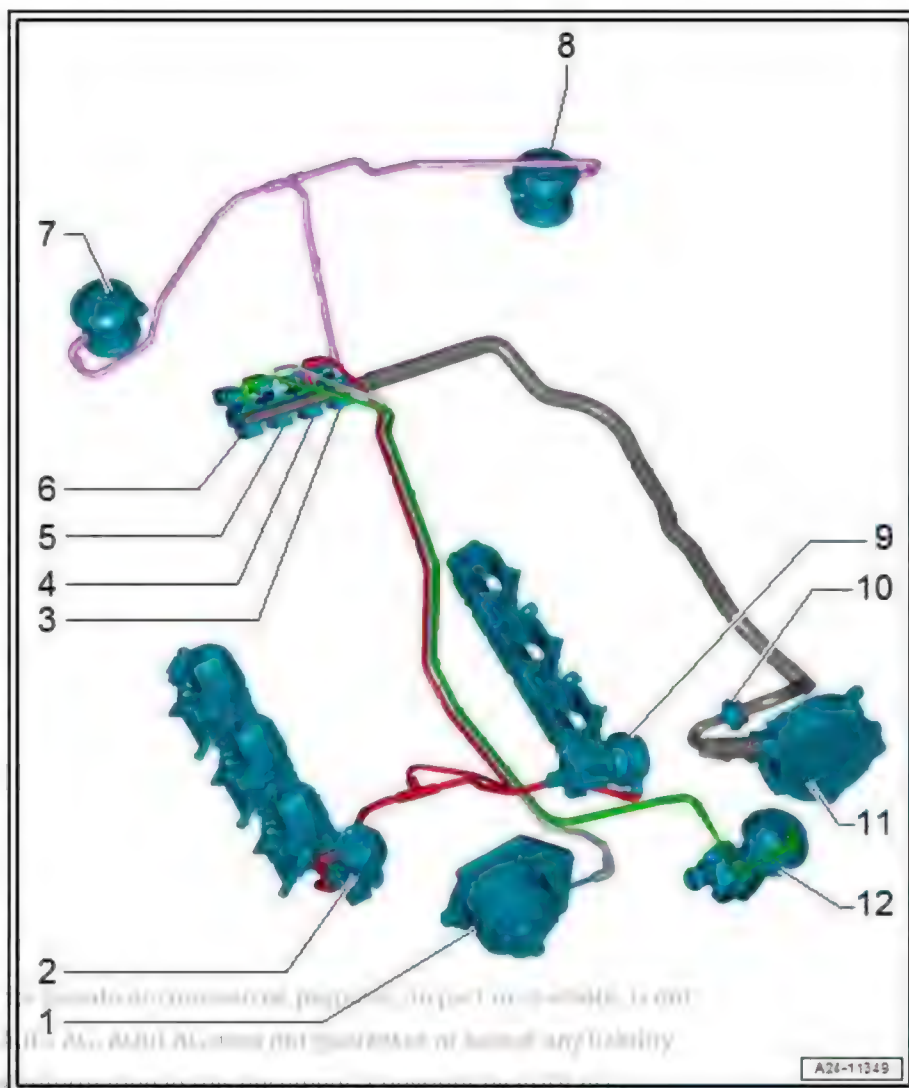
*Risk of engine malfunctions*

- ◆ *When routing vacuum lines, make sure they are not kinked, twisted or crushed.*

#### Note

- ◆ *Dark grey = Vacuum supply line*
- ◆ *Red = Control pipe to vacuum units for actuating intake manifold flaps*
- ◆ *Pink = Control pipe to the secondary air combination valves*
- ◆ *Green = Control pipe to coolant shut-off valve*
- ◆ *Light grey = Control pipe to coolant pump*

- 1 - Coolant pump
- 2 - Vacuum unit
  - For intake manifold flap on cylinder bank 1 (right-side)
- 3 - Secondary air inlet valve - N112-
- 4 - Intake manifold flap valve - N316-
- 5 - Solenoid for coolant circuit - N492-
- 6 - Coolant valve for cylinder head - N489-
- 7 - Combination valve for secondary air system (right-side)
- 8 - Combination valve for secondary air system (left-side)
- 9 - Vacuum unit
  - For intake manifold flap on cylinder bank 2 (left-side)
- 10 - Non-return valve
- 11 - Vacuum pump
- 12 - Coolant shut-off valve



## 2.2 Checking vacuum system

Special tools and workshop equipment required

- ◆ Hand vacuum pump - VAS 6213-



### Procedure

- Check all vacuum lines in the complete vacuum system for:
  - ◆ Cracks
  - ◆ Traces of animal bites

◆ Kinked or crushed lines

◆ Porous or leaking lines

- Check vacuum line to solenoid valve and from solenoid valve to corresponding component.

Hint If a fault is stored in the event memory, check the vacuum lines leading to the corresponding component and also check the remaining vacuum lines in the system.

- If it is not possible to build up a vacuum with the hand vacuum pump - VAS 6213- or if the vacuum pressure drops again immediately, check the hand vacuum pump and connecting hoses for leaks.

### 3 Air cleaner

⇒ ["3.1 Exploded view - air cleaner housing", page 292](#)

⇒ ["3.2 Removing and installing air cleaner housing", page 292](#)

#### 3.1 Exploded view - air cleaner housing

##### 1 - Air duct

- ☐ Clean out salt deposits, dirt and leaves, etc.

##### 2 - Sealing element

##### 3 - Mounting

- ☐ For air cleaner housing

##### 4 - Air cleaner housing

- ☐ Clean out salt deposits, dirt and leaves, etc.
- ☐ Removing and installing  
⇒ ["3.2 Removing and installing air cleaner housing", page 292](#)

##### 5 - Air filter element

- ☐ Use genuine air filter element ⇒ Electronic parts catalogue
- ☐ Change intervals ⇒ Maintenance tables
- ☐ Removing and installing  
⇒ Maintenance ; Booklet 411

##### 6 - Air pipe

- ☐ Tightening torque for screw-type clips  
⇒ ["2.2 Exploded view" - hose connections for charge air system", page 275](#)

##### 7 - Cover

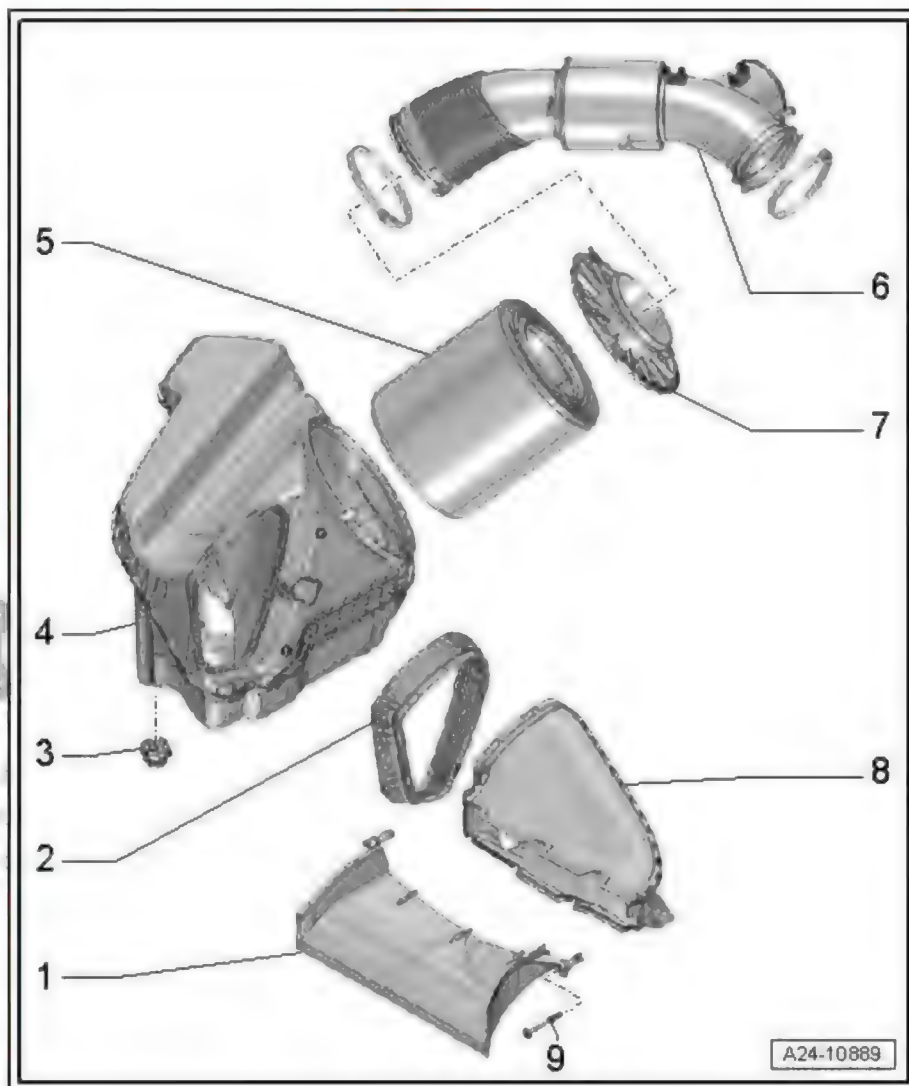
- ☐ For air cleaner housing
- ☐ Remove any salt deposits or dirt
- ☐ Removing and installing ⇒ Maintenance ; Booklet 411

##### 8 - Air duct

- ☐ Clean out salt deposits, dirt and leaves, etc.

##### 9 - Bolt

- ☐ 1.5 Nm

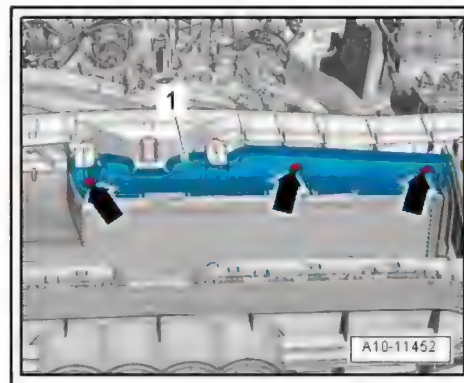


#### 3.2 Removing and installing air cleaner housing

##### Removing

- Remove lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing attachments .

- Remove bolts -arrows- and detach air duct -1-.

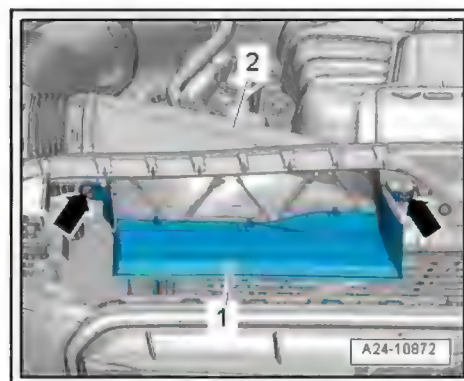


- Remove bolts -arrows- and detach air duct -2-.

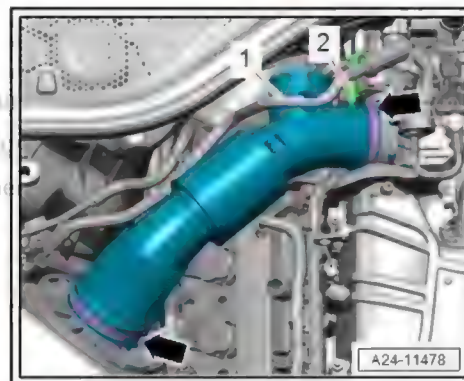


Note

*Disregard -item 1-.*



- Move hose -1- for activated charcoal filter system clear at air pipe.
- Detach vacuum hose -2- from connection on air pipe.
- Loosen hose clips -arrows- and detach air pipe, AUDI AG does not assume any liability with respect to the correctness of information in this document.





- Lift off air cleaner housing -1-.
- Press release tabs and disconnect secondary air hose -arrow-.

#### Installing



#### Note

- ◆ *The air cleaner housing must always be clean.*
- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ Electronic parts catalogue .*
- ◆ *To prevent malfunctions, cover all critical parts of the engine air intake tract (intake pipes, etc.) with a clean cloth before blowing out the air cleaner housing with compressed air.*

Remaining installation steps are carried out in reverse sequence; note the following:

- Install lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing attachments .

#### Tightening torques

- ◆ ⇒ ["3.1 Exploded view - air cleaner housing", page 292](#)
- ◆ ⇒ ["2.2 Exploded view - hose connections for charge air system", page 275](#)



Document by Audi AG. Copying for private or commercial purposes (print, electronic, digital) is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by Audi AG.

## 4 Intake manifold

⇒ ["4.1 Exploded view - intake manifold \(bottom section\) with fuel rail", page 295](#)

⇒ ["4.2 Removing and installing intake manifold \(bottom section\) with fuel rail", page 297](#)

⇒ ["4.3 Removing and installing throttle valve module J338", page 301](#)

⇒ ["4.4 Removing and installing regulating flap control unit J808", page 303](#)

### 4.1 Exploded view - intake manifold (bottom section) with fuel rail

MPI low-pressure injection system



Note

*Illustration shows components for cylinder bank 2 (left-side).*

#### 1 - Vacuum hose

- ☐ To intake manifold flap valve - N316-

#### 2 - O-ring

- ☐ Renew after removing

#### 3 - Intake manifold flap potentiometer 2 - G512-

- ☐ Cylinder bank 1 (right-side): intake manifold flap potentiometer - G336-

#### 4 - O-ring

- ☐ Renew after removing

#### 5 - Retaining clip

#### 6 - Injector

- ☐ For MPI low-pressure injection system
- ☐ Removing and installing  
⇒ ["5.3.1 Removing and installing injectors - vehicles with MPI engine", page 310](#)

#### 7 - O-ring

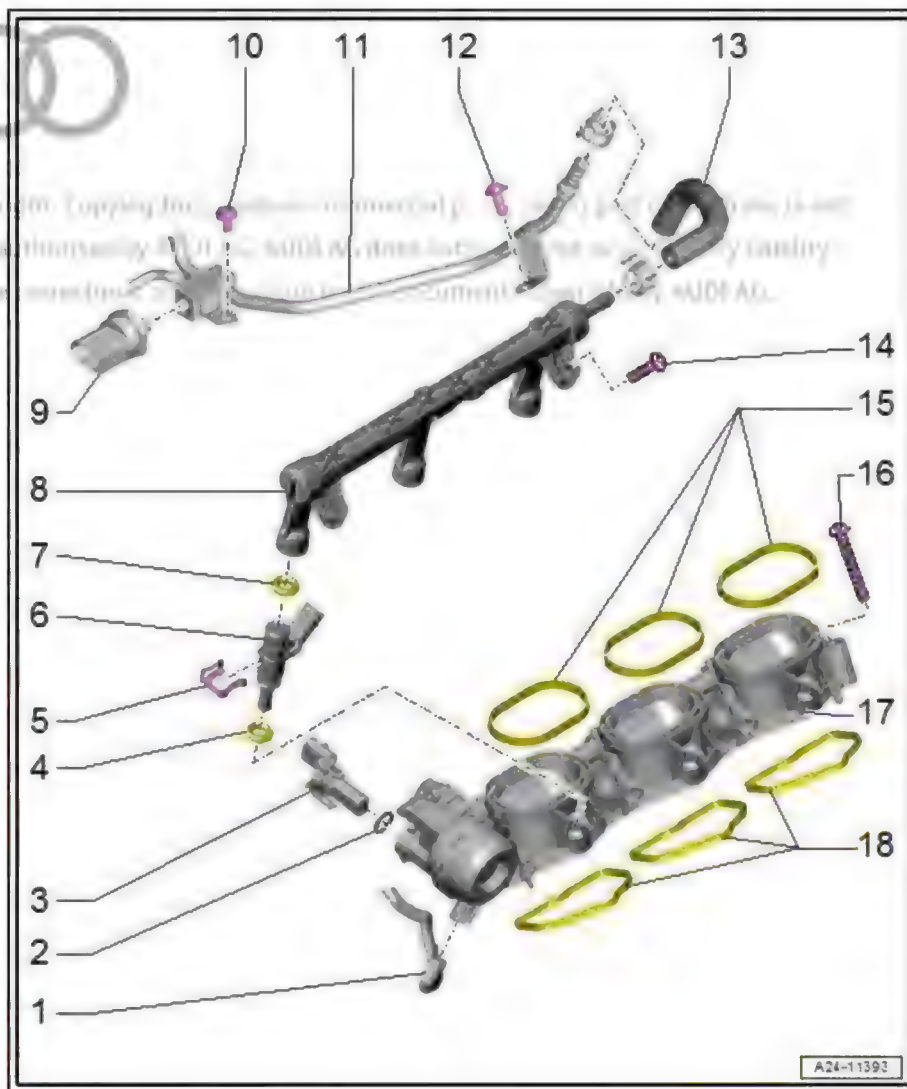
- ☐ Renew after removing

#### 8 - Fuel rail

- ☐ For MPI low-pressure injection system
- ☐ Removing and installing  
⇒ ["5.2.1 Removing and installing fuel rail, MPI injection", page 308](#)

#### 9 - Fuel pressure sender for low pressure - G410-

- ☐ Removing and installing  
⇒ ["6.3 Removing and installing fuel pressure sender for low pressure G410", page 319](#)



- ☐ 15 Nm
- 10 - Bolt
  - ☐ 9 Nm
- 11 - Fuel supply line
  - ☐ For MPI low-pressure injection system
- 12 - Bolt
  - ☐ 9 Nm
- 13 - Fuel hose
- 14 - Bolt
  - ☐ 5 Nm
- 15 - Gaskets
  - ☐ Renew after removing
- 16 - Bolt
  - ☐ Tightening torque
    - ⇒ Fig. "Intake manifold (bottom section) for cylinder bank 1 (right-side) - tightening torque" , page 296 ,
    - ⇒ Fig. "Intake manifold (bottom section) for cylinder bank 2 (left-side) - tightening torque" , page 296
- 17 - Intake manifold (bottom section)
  - ☐ Removing and installing
    - ⇒ "4.2 Removing and installing intake manifold (bottom section) with fuel rail" , page 297
- 18 - Gaskets
  - ☐ Renew after removing

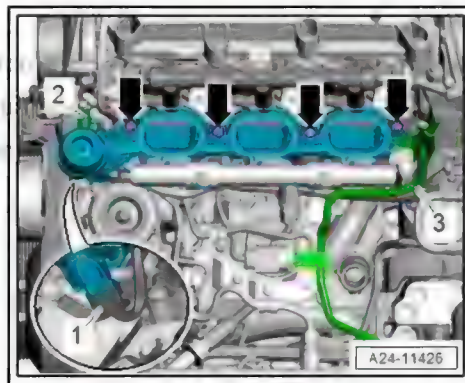
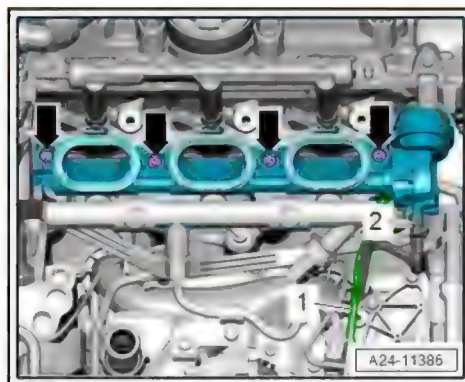
Intake manifold (bottom section) for cylinder bank 1 (right-side) - tightening torque

- Tighten bolts and nuts -arrows- in stages (final torque 9 Nm).



Intake manifold (bottom section) for cylinder bank 2 (left-side) - tightening torque

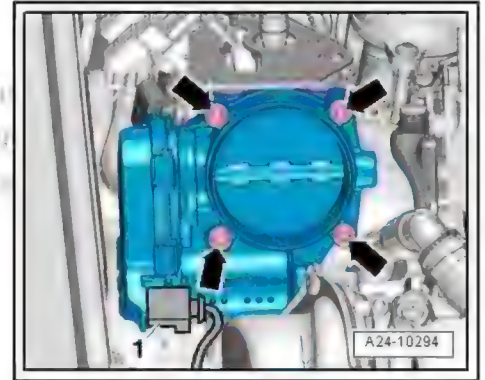
- Tighten bolts and nuts -arrows- in stages (final torque 9 Nm).



#### Throttle valve module - J338- - tightening torque

- Tighten bolts -arrows- in diagonal sequence to 10 Nm.

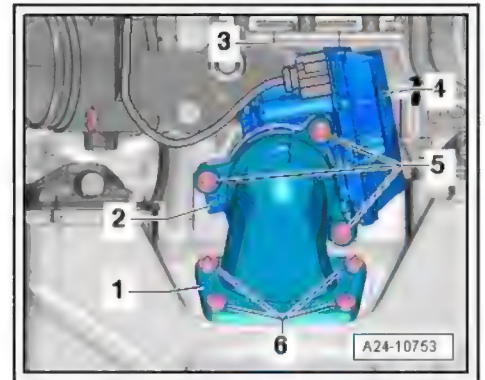
*Protected by copyright. Copying for private or commercial use is prohibited unless authorized by AUDI AG. AUDI AG does not give any warranty to the government information to the public.*



#### Regulating flap control unit - J808- - tightening torque and sequence

- Tighten bolts in stages as follows:

Stage	Bolts	Tightening torque
1.	-5, 6-	Screw in by hand until contact is made
2.	-6-	10 Nm
3.	-5-	10 Nm



## 4.2 Removing and installing intake manifold (bottom section) with fuel rail

Special tools and workshop equipment required

- ◆ Tool inserts - V.A.G 1331/2-
- ◆ Hand vacuum pump - VAS 6213-



#### Removing

- Remove supercharger  
 ⇒ ["1.4 Removing and installing supercharger", page 244](#) .



Intake manifold (bottom section) for cylinder bank 1 (right-side):

- Move fuel hose -1- clear at MPI fuel rail.
- Unplug electrical connectors -4- and move electrical wiring clear.



Note

Place a cloth underneath to catch escaping fuel.

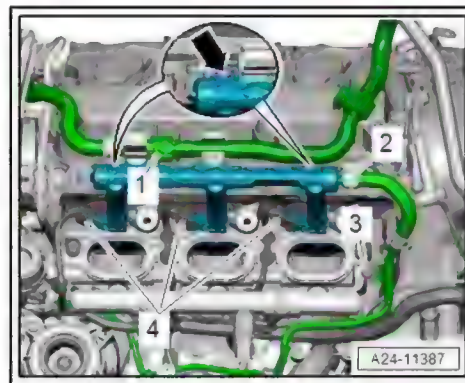


#### WARNING

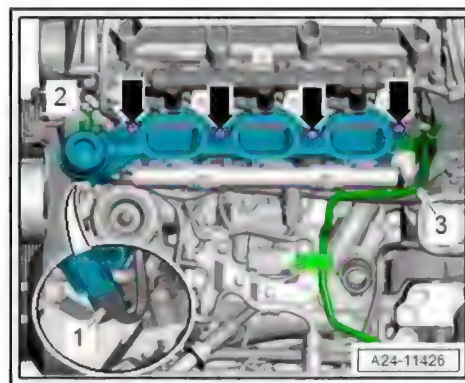
*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

- Put on safety goggles.
- Put on protective gloves.
- Release pressure (wrap a clean cloth around connection and open connection carefully).



- Release hose clip -2- and detach fuel hose.
- Remove bolts -3- and -arrow-.
- Disconnect vacuum hose -2-.
- Unscrew bolts -arrows- and detach bottom section of intake manifold (right-side), paying attention to MPI fuel line -3-.
- Unplug electrical connector -1-.



Protected by copyright. Copying for private non-commercial purposes is permitted. However, the reproduction of this document for other than private non-commercial purposes without the written permission of AUDI AG is prohibited. AUDI AG does not accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Intake manifold (bottom section) for cylinder bank 2 (left-side):



*Place a cloth underneath to catch escaping fuel.*

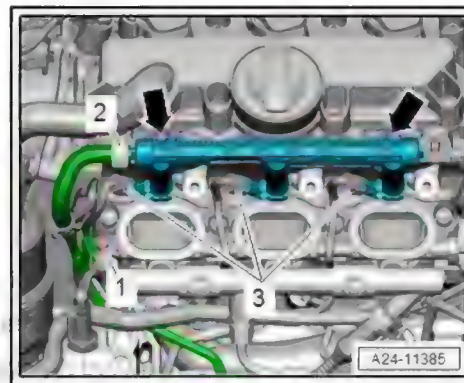


# **WARNING**

*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

- *Put on safety goggles.*
- *Put on protective gloves.*
- *Release pressure (wrap a clean cloth around connection and open connection carefully).*



- Release hose clip -2- and detach fuel hose.
- Unplug electrical connectors -3- and move electrical wiring clear.
- Remove bolts -1- and -arrows-.
- Unplug electrical connector -2- and disconnect vacuum hose -1-.
- Unscrew bolts -arrows- and detach bottom section of intake manifold (left-side), paying attention to MPI fuel line.

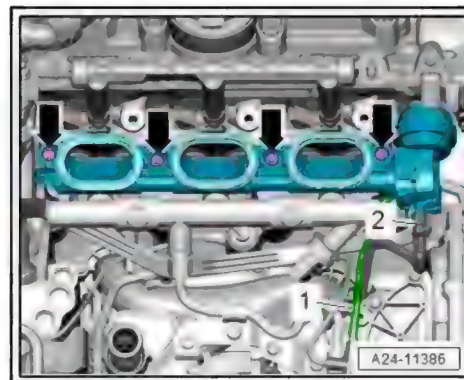
Both sides (continued):



# **Caution**

*Risk of irreparable damage to engine.*

- ◆ *Block off the intake ports with clean cloths to prevent small objects from dropping into the engine through the intake ports in the cylinder heads.*



## **Installing**

Installation is carried out in reverse order; note the following:



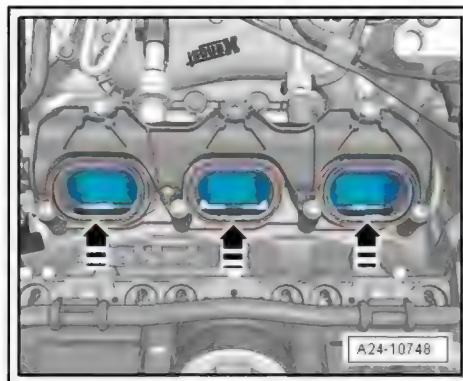
- ◆ *Renew seals after removing.*
- ◆ *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*



### Caution

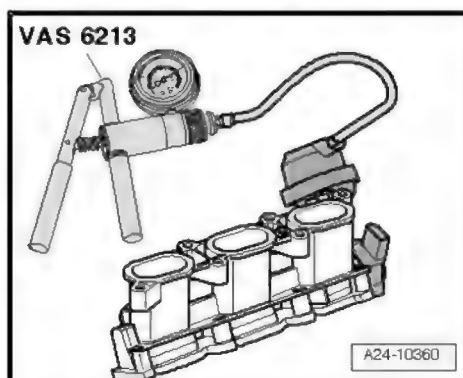
*Risk of damage to intake manifold flaps.*

- ◆ *To prevent the intake manifold flaps from catching on the guide plates in the cylinder head, the flaps must be in the power mode position -arrows- (intake passage fully open) when the intake manifold (bottom section) is installed.*



Intake manifold (bottom section) for cylinder bank 1 (right-side):

- Connect hand vacuum pump - VAS 6213- to vacuum unit (right-side), as shown in illustration.
- Use vacuum pump to generate a vacuum.
- This will cause the intake manifold flaps to open.

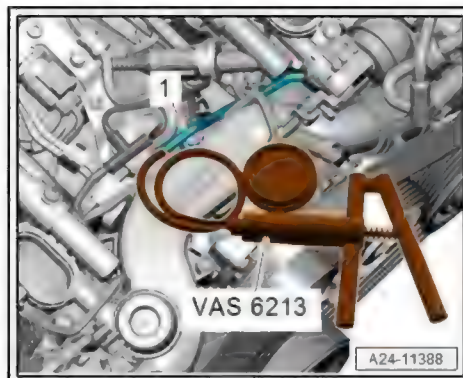


Intake manifold (bottom section) for cylinder bank 2 (left-side):

- Connect hand vacuum pump - VAS 6213- to vacuum hose -1- for vacuum unit (left-side), as shown in illustration.
- Use vacuum pump to generate a vacuum.
- This will cause the intake manifold flaps to open.

Both sides (continued):

- Tighten bolts and nuts for intake manifold (bottom section).
- Press intake manifold (bottom section) with fuel rail evenly on to injectors.
- Disconnect hand vacuum pump from vacuum unit/vacuum hose.
- Install supercharger  
⇒ ["1.4 Removing and installing supercharger", page 244](#) .



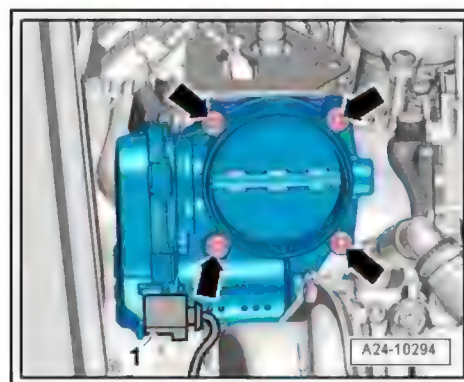
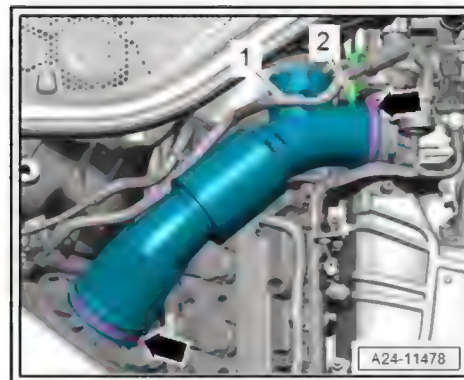
Tightening torques

- ◆ ⇒ ["4.1 Exploded view - intake manifold \(bottom section\) with fuel rail", page 295](#)
- ◆ ⇒ [Fig. "Intake manifold \(bottom section\) for cylinder bank 2 \(left-side\) - tightening torque", page 296](#)
- ◆ ⇒ [Fig. "Intake manifold \(bottom section\) for cylinder bank 1 \(right-side\) - tightening torque", page 296](#)

## 4.3 Removing and installing throttle valve module - J338-

### Removing

- Remove engine cover panel  
⇒ "3.1 Removing and installing engine cover panel",  
page 43 .
- Move hose -1- for activated charcoal filter system clear at air pipe.
- Detach vacuum hose -2- from connection on air pipe.
- Loosen hose clips -arrows- and detach air pipe.
- Unplug electrical connector -1-.
- Unscrew bolts -arrows- and detach throttle valve module - J338- .
- Disconnect intermediate flange from crankcase breather shut-off valve - N548- and detach.



### Caution

*Risk of irreparable damage to engine.*

- ◆ *Block off the intake port with a clean cloth to prevent small items from dropping into the supercharger.*

### Installing

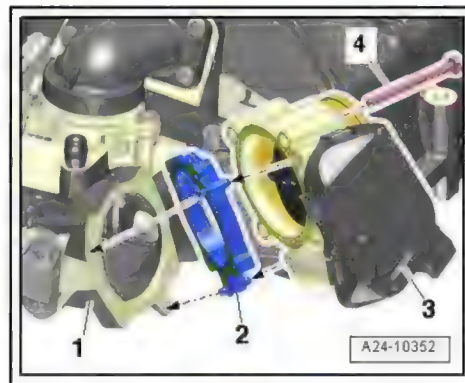
Installation is carried out in reverse order; note the following:



### Note

- ◆ *Renew O-rings after removing.*
- ◆ *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*

- Insert intermediate flange -2- with O-rings into supercharger -1- -left arrows-.
- Fit throttle valve module - J338- -item 3- on intermediate flange -right arrows-.
- Tighten bolts -4-.
- Engage crankcase breather shut-off valve - N548- .
- Install engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#) .
- Adapt throttle valve module after renewal:
  - Vehicle diagnostic tester must be connected.
  - Selecting operating mode.
  - Using [Go To](#) button and "Function/component selection" function, select the following in succession from tree:
    - ◆ Drive train
    - ◆ 01 - Self-diagnosis compatible systems
    - ◆ Simos injection and ignition system
    - ◆ Functions
    - ◆ Adapt throttle valve control module



#### Tightening torques

- ◆ ⇒ [Fig. "" Throttle valve module -J338- - tightening torque"" , page 297](#)
- ◆ ⇒ ["2.2 Exploded view - hose connections for charge air system", page 275](#)



Verboten by copyright. Copying the private or commercial purpose in part or in whole is not permitted unless authorized by AUDI AG. AUDI AG does not guarantee the accuracy of the information. For more information, please contact your local Audi representative. Copyright by AUDI AG.

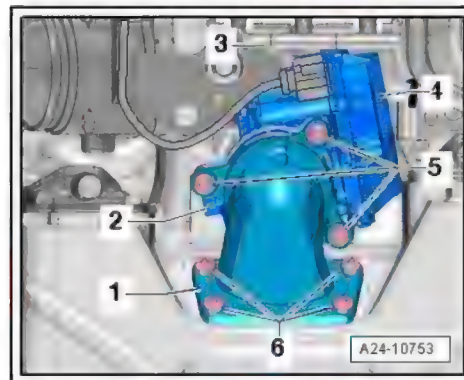
## 4.4 Removing and installing regulating flap control unit - J808-

### Removing

- Remove engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#).
- Unplug electrical connector -3-.
- Remove bolts -5- and -6-.
- Detach bypass elbow -1- with intermediate flange -2- and regulating flap control unit - J808- -item 4-.

### Installing

Installation is carried out in reverse order; note the following:



### Note

*Renew O-rings after removing.*

- Install engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#).
- Adapt regulating flap control unit after renewal:
  - Vehicle diagnostic tester must be connected.
  - Selecting operating mode.
  - Using **[Go To]** button and "Function/component selection" function, select the following in succession from tree:
    - ◆ Drive train
    - ◆ 01 - Self-diagnosis compatible systems
    - ◆ Simos injection and ignition system
    - ◆ Functions
    - ◆ Adapt regulating flap control unit

### Tightening torques

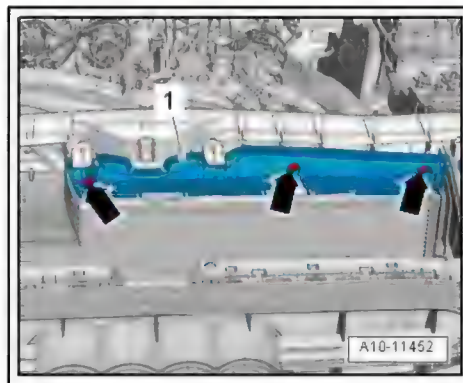
- ◆ ⇒ [Fig. "" Regulating flap control unit -J808- - tightening torque and sequence"" , page 297](#)

## 4.5 Removing and installing fuel line

### Removing

- Remove intake manifold (bottom section) for cylinder bank 1 (right-side)  
⇒ ["4.2 Removing and installing intake manifold \(bottom section\) with fuel rail", page 297](#).
- Remove lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing attachments.

- Remove bolts -arrows- and detach air duct -1-.

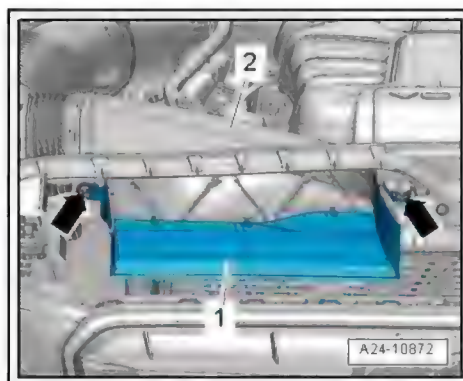


- Remove bolts -arrows- and detach air duct -2- from air cleaner housing.

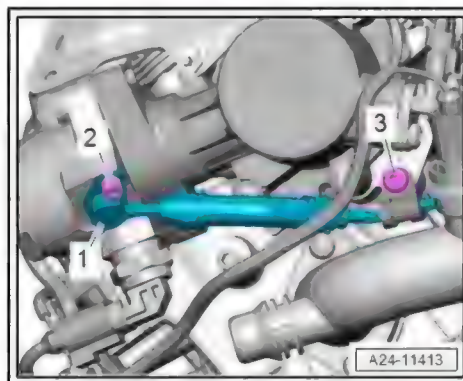


Note

Disregard -item 1-.



- Unscrew bolts -2, 3- and detach connection -1-.

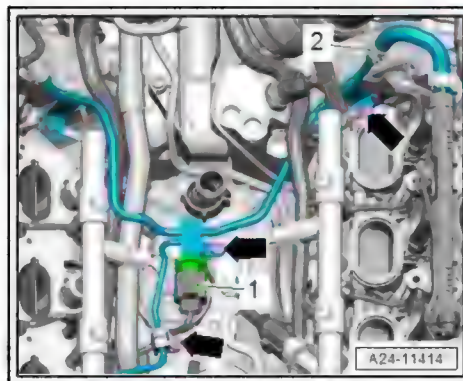


- Release hose clip -2- and detach fuel hose.
- Remove bolts -arrows-, detach fuel line and unplug electrical connector -1-.

#### Installing

Installation is carried out in reverse order; note the following:

- Install lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing attachments .
- Install intake manifold (bottom section) for cylinder bank 1 (right-side)  
⇒ ["4.2 Removing and installing intake manifold \(bottom section\) with fuel rail", page 297](#) .



#### Tightening torques

- ◆ ⇒ ["4.1 Exploded view - intake manifold \(bottom section\) with fuel rail", page 295](#)
- ◆ ⇒ ["3.1 Exploded view - air cleaner housing", page 292](#)

## 5 Injectors

⇒ ["5.1 Exploded view - fuel rail with injectors", page 305](#)

⇒ ["5.2 Removing and installing fuel rail", page 308](#)

⇒ ["5.3 Removing and installing injectors", page 310](#)

⇒ ["5.4 Cleaning FSI injectors - vehicles with FSI engine", page 316](#)

### 5.1 Exploded view - fuel rail with injectors

⇒ ["5.1.1 Exploded view - fuel rail with injectors, vehicles with MPI low-pressure injection system", page 305](#)

⇒ ["5.1.2 Exploded view - fuel rail with injectors, vehicles up to 03.2015 with FSI high-pressure injection system", page 305](#)

⇒ ["5.1.3 Exploded view - fuel rail with injectors, vehicles from 04.2015 onwards with FSI high-pressure injection system", page 307](#)

#### 5.1.1 Exploded view - fuel rail with injectors, vehicles with MPI low-pressure injection system

For exploded view of fuel rail with injectors on vehicles with MPI low-pressure injection system; refer to

⇒ ["4.1 Exploded view - intake manifold \(bottom section\) with fuel rail", page 295](#).

#### 5.1.2 Exploded view - fuel rail with injectors, vehicles up to 03.2015 with FSI high-pressure injection system

FSI high-pressure injection system

# 1 - Injector

- ☐ Removing and installing  
⇒ ["5.3.2 Removing and installing injectors - vehicles with FSI engine", page 311](#)

# 2 - Spacer ring

- ☐ Renew if damaged

# 3 - O-ring

- ☐ Renew after removing
- ☐ Lubricate lightly with clean engine oil

# 4 - Support ring

- ☐ Renew after removing
- ☐ Make sure it is correctly seated
- ☐ Via this support ring, the fuel rail exerts the force which holds the injector in the cylinder head

# 5 - Fuel pressure sender - G247-

- ☐ Removing and installing  
⇒ ["6.2 Removing and installing fuel pressure sender G247", page 318](#)
- ☐ Lubricate threads lightly with clean engine oil
- ☐ 25 Nm

# 6 - Bolt

- ☐ 9 Nm

# 7 - High-pressure pipe

- ☐ Removing and installing ⇒ ["7.3 Removing and installing high-pressure pipe", page 326](#)
- ☐ Do not alter shape
- ☐ Check for damage before re-installing
- ☐ To loosen and tighten high-pressure pipe, counterhold at pipe connection
- ☐ Lubricate threads of union nuts with fuel
- ☐ 25 Nm

# 8 - Threaded connection

- ☐ 40 Nm
- ☐ Renew after removing

# 9 - Fuel rail

# 10 - Bolt

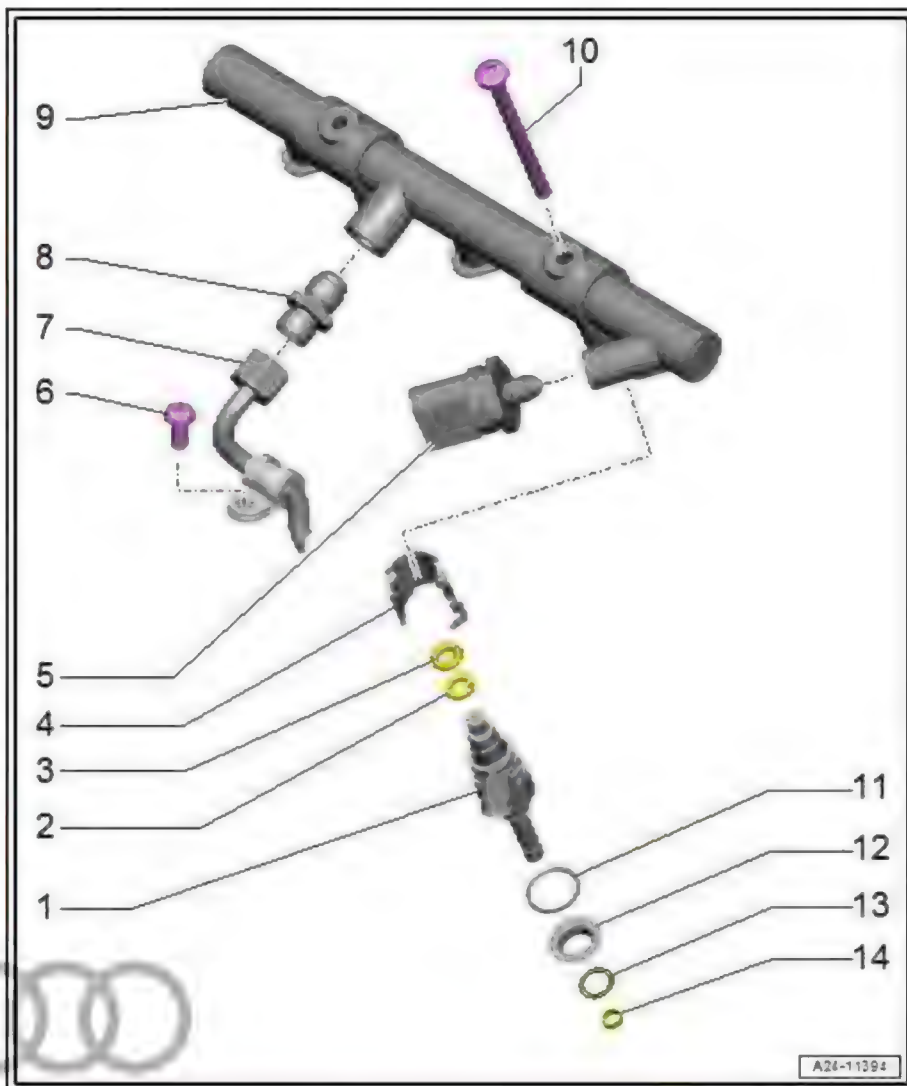
- ☐ Tighten alternately in stages; final torque 9 Nm

# 11 - Washer

- ☐ Renew if damaged
- ☐ Installation position: conical side faces injector

# 12 - Retaining ring

- ☐ Renew if damaged
- ☐ Fitting location: side with collar faces injector



### 13 - Circlip

- ☐ Renew if damaged

### 14 - Combustion chamber ring seal

- ☐ Renew after removing  
⇒ ["5.3.2 Removing and installing injectors - vehicles with FSI engine", page 311](#)
- ☐ Do not apply grease or use any other lubricants

## 5.1.3 Exploded view - fuel rail with injectors, vehicles from 04.2015 onwards with FSI high-pressure injection system

### FSI high-pressure injection system

#### 1 - Bolt

- ☐ 9 Nm

#### 2 - High-pressure pipe

- ☐ Removing and installing  
⇒ ["7.3 Removing and installing high-pressure pipe", page 326](#)
- ☐ Do not alter shape
- ☐ Check for damage before re-installing
- ☐ To loosen and tighten high-pressure pipe, counterhold at pipe connection
- ☐ Lubricate threads of union nuts with fuel
- ☐ 25 Nm

#### 3 - Connection

- ☐ 40 Nm
- ☐ Renew after removing

#### 4 - Fuel rail

#### 5 - Bolt

- ☐ Tighten alternately in stages; final torque 9 Nm

#### 6 - Support ring

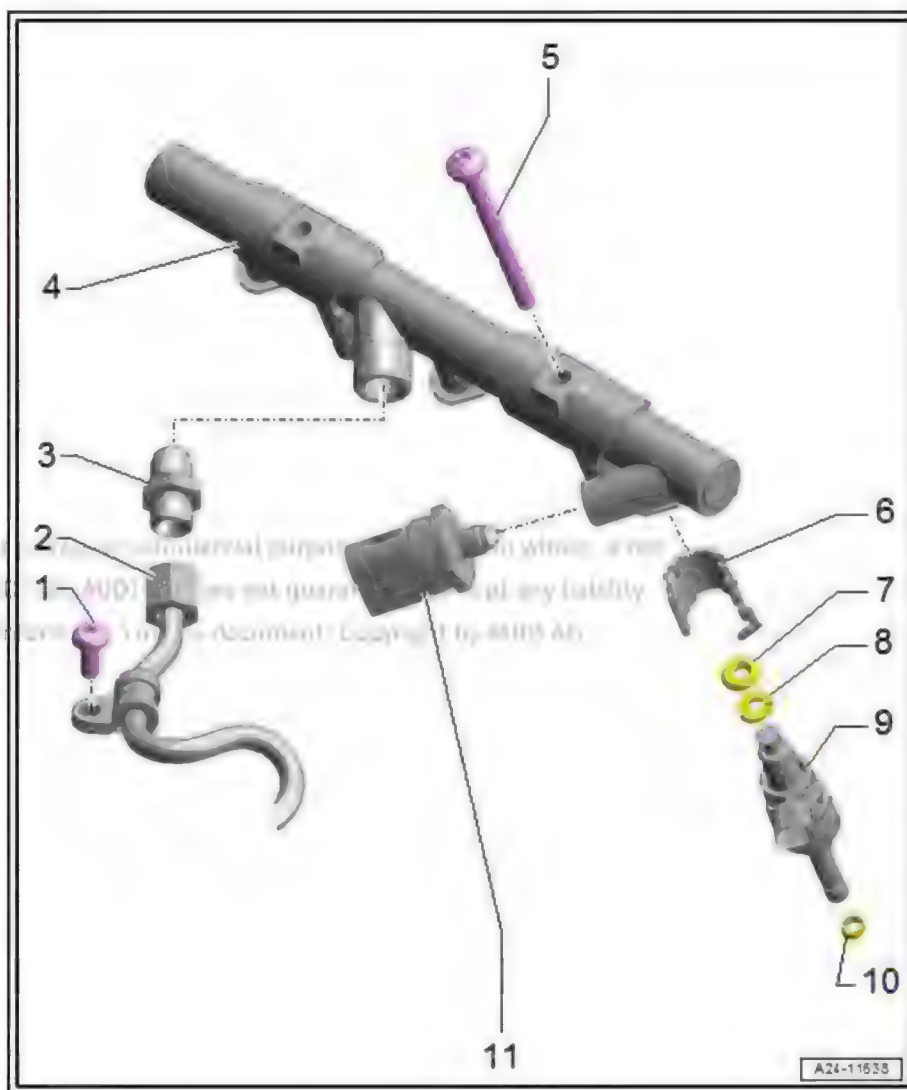
- ☐ Renew after removing
- ☐ Make sure it is correctly seated
- ☐ Via this support ring, the fuel rail exerts the force which holds the injector in the cylinder head

#### 7 - O-ring

- ☐ Renew after removing
- ☐ Lubricate lightly with clean engine oil

#### 8 - Spacer ring

- ☐ Renew if damaged





## 9 - Injector

- ☐ Removing and installing  
⇒ ["5.3.2 Removing and installing injectors - vehicles with FSI engine", page 311](#)
- ☐ Cleaning ⇒ ["5.4 Cleaning FSI injectors - vehicles with FSI engine", page 316](#)

## 10 - Combustion chamber ring seal

- ☐ Renew after removing  
⇒ ["5.3.2 Removing and installing injectors - vehicles with FSI engine", page 311](#)
- ☐ Do not apply grease or use any other lubricants

## 11 - Fuel pressure sender - G247-

- ☐ Removing and installing ⇒ ["6.2 Removing and installing fuel pressure sender G247 ", page 318](#)
- ☐ Lubricate threads lightly with clean engine oil
- ☐ 25 Nm

## 5.2 Removing and installing fuel rail

⇒ ["5.2.1 Removing and installing fuel rail, MPI injection", page 308](#)

⇒ ["5.2.2 Removing and installing fuel rail, FSI injection", page 309](#)

### 5.2.1 Removing and installing fuel rail, MPI injection



#### Note

*The removal and installation procedures are described for cylinder bank 1 (right-side).*


#### Removing

- Remove supercharger  
⇒ ["1.4 Removing and installing supercharger", page 244](#) .



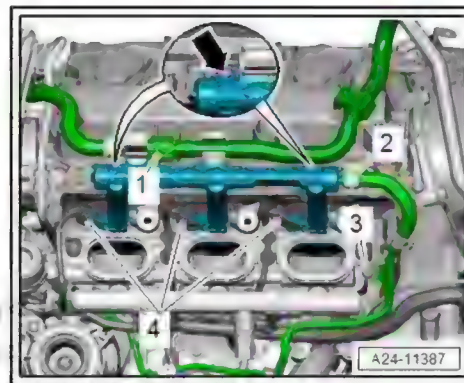
Produced by copyright. Copied for private commercial purposes is permitted without charge. All rights reserved. All trademarks are the property of their respective owners. Copyright by AUDI AG.

- Move fuel hose -1- clear.

**WARNING**

*The fuel system is pressurised.  
Risk of injury as fuel may spray out.*

- Put on safety goggles.
- Put on protective gloves.
- Release pressure (wrap a clean cloth around connection and open connection carefully).



- Unplug electrical connectors -4-.
- Release hose clip -2- and detach fuel hose.
- Remove bolts -arrow- and detach fuel rail with injectors from intake manifold (bottom section).

 **Note**

*Disregard -item 3-.*

**Installing**

Installation is carried out in reverse order; note the following:

 **Note**

- ◆ *Renew O-rings after removing.*
- ◆ *Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .*

- Install supercharger  
⇒ [“1.4 Removing and installing supercharger”, page 244 .](#)

**Tightening torques**

- ◆ ⇒ [“4.1 Exploded view - intake manifold \(bottom section\) with fuel rail”, page 295](#)

## 5.2.2 Removing and installing fuel rail, FSI injection

 **Note**

*The removal and installation procedures are described for cylinder bank 2 (left-side).*

**Removing**

- Remove supercharger  
⇒ [“1.4 Removing and installing supercharger”, page 244 .](#)

- Unplug electrical connector -2-.

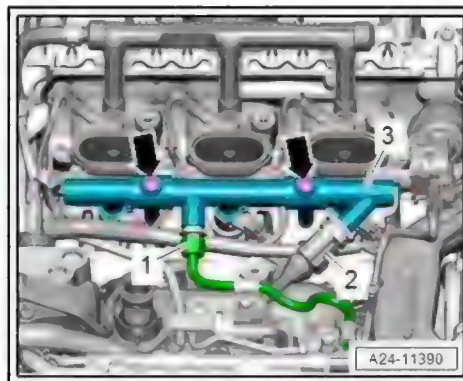


#### WARNING

*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

- Put on safety goggles.
- Put on protective gloves.
- Release pressure (wrap a clean cloth around connection and open connection carefully).



- Remove union nut -1- and bolts -arrows- and detach fuel rail -3- from injectors.



#### Note

*Unplug electrical connectors of any injectors that remained lodged in fuel rail.*

#### Installing

Installation is carried out in reverse order; note the following:



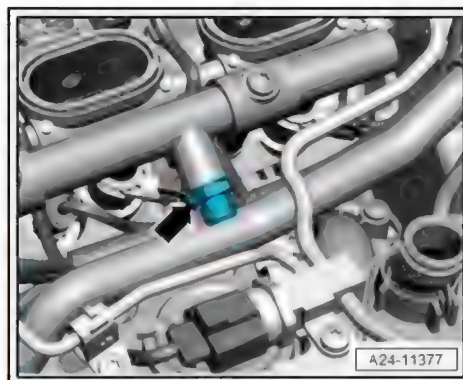
#### Note

*Renew O-rings after removing.*

- If connection -arrow- has been unfastened or unbolted, it must be renewed.
- Install supercharger  
⇒ [“1.4 Removing and installing supercharger”, page 244](#) .

#### Tightening torques

- ◆ ⇒ [“5.1 Exploded view - fuel rail with injectors”, page 305](#)



## 5.3 Removing and installing injectors

⇒ [“5.3.1 Removing and installing injectors - vehicles with MPI engine”, page 310](#)

⇒ [“5.3.2 Removing and installing injectors - vehicles with FSI engine”, page 311](#)

### 5.3.1 Removing and installing injectors - vehicles with MPI engine



#### Note

*The removal and installation procedures are described for cylinder bank 1 (right-side).*

## Removing

- Remove supercharger  
⇒ ["1.4 Removing and installing supercharger", page 244](#) .
- Move fuel hose -1- clear.
- Unplug electrical connectors -4-.

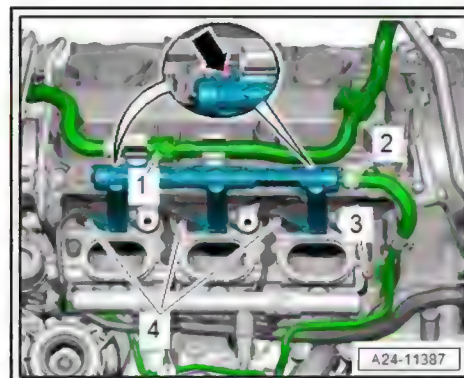


### WARNING

*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

- Put on safety goggles.
- Put on protective gloves.
- Release pressure (wrap a clean cloth around connection and open connection carefully).



- Release hose clip -2- and detach fuel hose.
- Remove bolts -arrow- and detach fuel rail with injectors from intake manifold (bottom section).



### Note

*Disregard -item 3-.*

- Remove retaining clip -2- and detach injector -3- from fuel rail -1-.

## Installing

Installation is carried out in reverse order; note the following:



### Note

- ◆ Renew O-rings after removing.
- ◆ Secure all hose connections with correct type of hose clips (as original equipment) ⇒ *Electronic parts catalogue* .

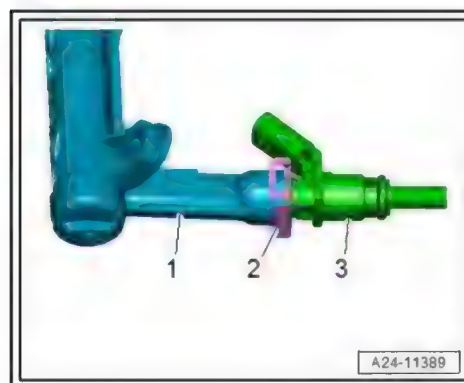
- Install supercharger  
⇒ ["1.4 Removing and installing supercharger", page 244](#) .

## Tightening torques

- ◆ ⇒ ["5.1 Exploded view - fuel rail with injectors", page 305](#)

## 5.3.2 Removing and installing injectors - vehicles with FSI engine

Special tools and workshop equipment required



◆ Tool set for FSI engines - T10133 C-



Removing

- Remove relevant fuel rail  
⇒ ["5.2 Removing and installing fuel rail", page 308](#).

Removing any injectors lodged in fuel rail:

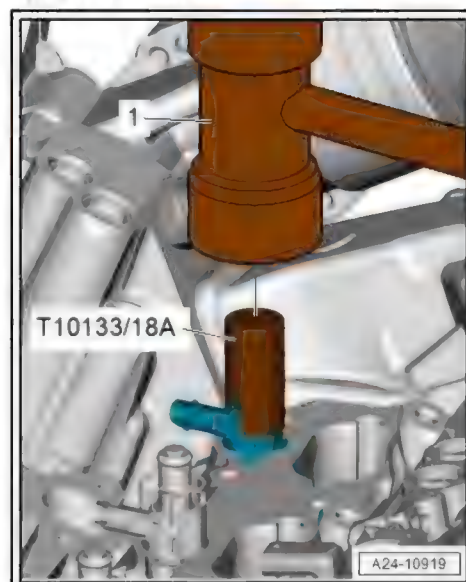
- Carefully pull injectors out of fuel rail.

Removing any injectors lodged in cylinder head:

- Cover open inlet ports with a clean cloth.
- Unplug electrical connector on injector that is to be removed.
- Slide sleeve -T10133/18A- over injector.
- Carefully knock against stop sleeve several times to loosen injector.

 Note

- ◆ Use a torque wrench to pull out injector.
- ◆ Adjust torque wrench to 5 Nm.



- Apply puller -T10133/20- to groove on injector.
- Attach removal tool -T10133/16A- and pull out injector by turning bolt -T10133/21-.



#### Dismantling injector - vehicles up to 03.2015

- Pull support ring -4-, O-ring -3- and spacer ring -2- off injector -1-.

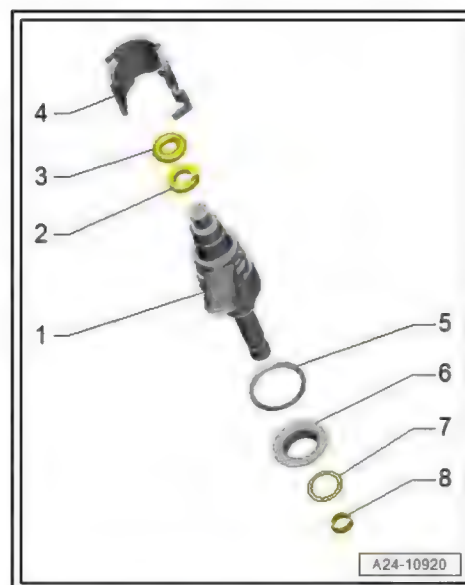


*Renew retaining ring -6-, washer -5- and circlip -7- only if they are damaged or when installing a new injector.*

- Carefully remove old combustion chamber ring seal -8-. To do so, cut open combustion chamber ring seal using knife or prise open with small screwdriver and then pull off forwards.



*Take care not to damage groove on injector. Injector must be renewed if groove is damaged.*

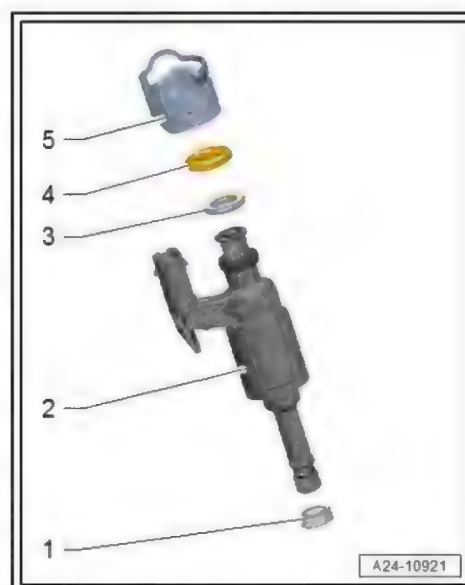


#### Dismantling injector - vehicles from 04.2015 onwards

- Pull support ring -5- and spacer ring -3- off injector -2-.
- Carefully remove old combustion chamber ring seal -1-. To do so, cut open seal using knife or prise open with small screwdriver and then pull off forwards.



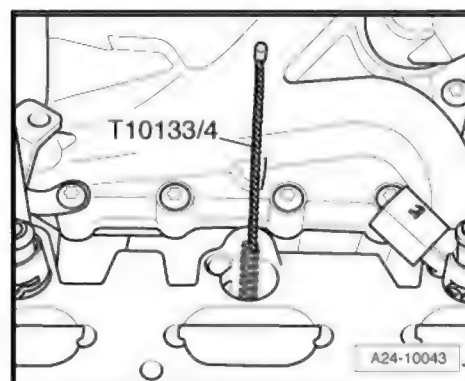
*Take care not to damage groove on injector. The injector must be renewed if the groove is damaged.*



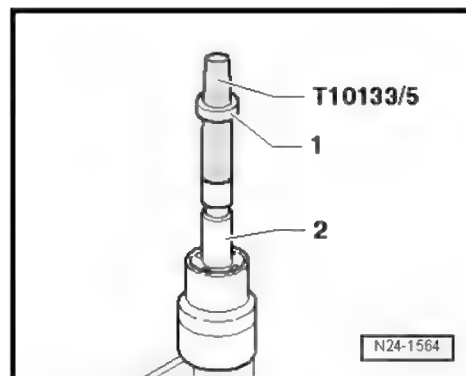
#### Installing



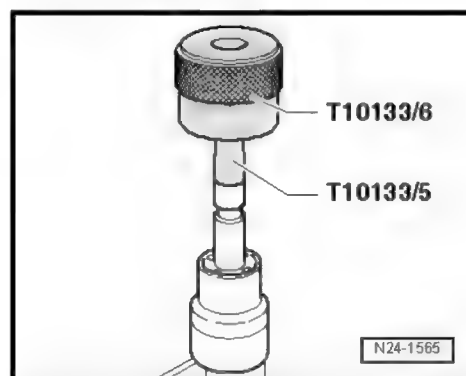
- ♦ *Renew combustion chamber ring seal, spacer ring, O-ring and support ring after removing.*
- ♦ *Lubricate O-rings of injectors lightly with clean engine oil.*
- Clean bore in cylinder head with nylon cylinder brush - T10133/4- .



- Fit assembly cone -T10133/5- with new combustion chamber ring seal -1- from repair kit onto injector -2-.



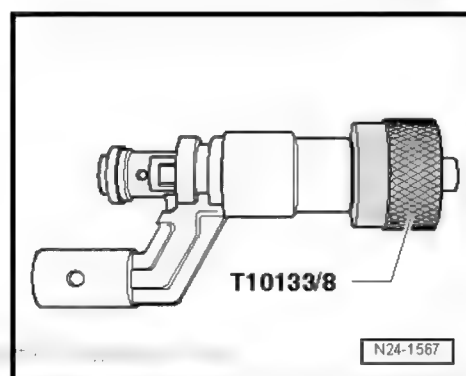
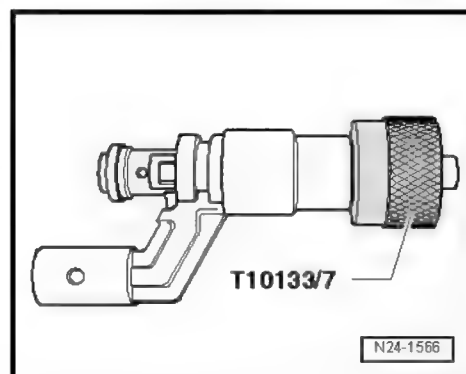
- Using assembly sleeve -T10133/6-, push combustion chamber ring seal onto assembly cone -T10133/5- as far as it will go.
- Turn round assembly sleeve -T10133/6- and slide combustion chamber ring seal into groove.



#### Note

*The combustion chamber ring seal is widened when it is pushed onto the injector. After pushing it on, it therefore has to be compressed again. This is done in two stages, as described below.*

- Push calibration sleeve -T10133/7- onto injector as far as it will go and simultaneously turn it slightly (approx. 180°).
- Pull calibration sleeve -T10133/7- off again by turning it in the opposite direction.
- Push calibration sleeve -T10133/8- onto injector as far as it will go and simultaneously turn it slightly (approx. 180°).
- Pull calibration sleeve -T10133/8- off again by turning it in the opposite direction.



#### Fully assembling injector - vehicles up to 03.2015

- Fit parts from repair kit onto injector -1-:

2 - Spacer ring

3 - O-ring

4 - Support ring

5 - Washer

6 - Retaining ring

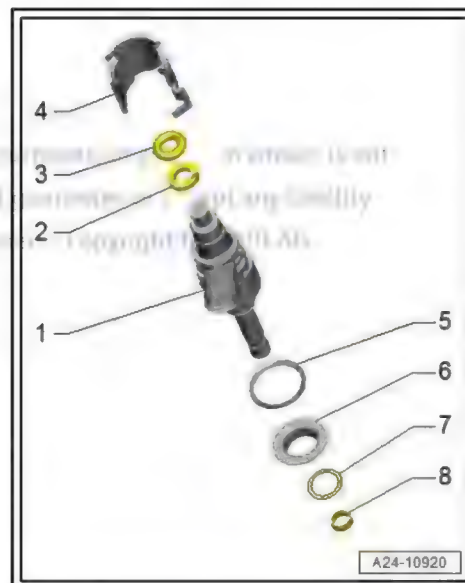
7 - Circlip

- To make it easier to install injector in fuel rail, lubricate new O-ring lightly with clean engine oil before installing it.



Note

*The combustion chamber ring seal -8- must not be lubricated.*



#### Fully assembling injector - vehicles from 04.2015 onwards

- Fit parts from repair kit onto injector -2-:

3 - Spacer ring

4 - O-ring

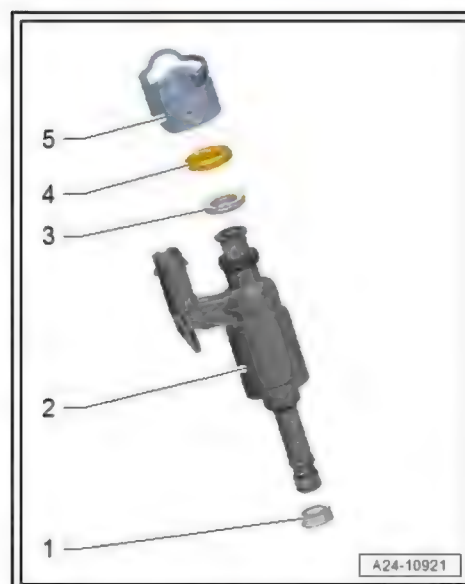
5 - Support ring

- To make it easier to install injector in fuel rail, lubricate new O-ring lightly with clean engine oil before installing it.



Note

*The combustion chamber ring seal -1- must not be lubricated.*



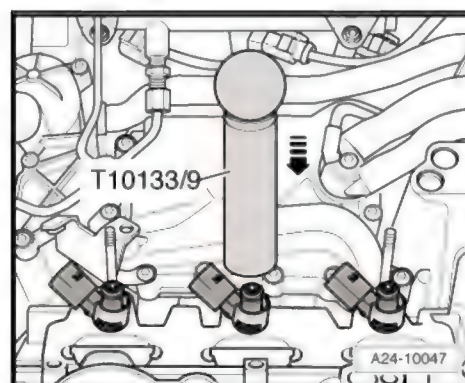
#### All vehicles (continued)

- Use assembly tool -T10133/9- to insert injector as far as it will go into hole in cylinder head; note correct installation position.
- Electrical connector of injector must engage in recess in cylinder head.



Note

*It should be possible to insert the injector easily. If necessary wait until the combustion chamber ring seal has contracted sufficiently.*



Perform further installation in reverse order, paying attention to the following:

- Install fuel rail  
⇒ ["5.2 Removing and installing fuel rail", page 308](#) .

## 5.4 Cleaning FSI injectors - vehicles with FSI engine

Special tools and workshop equipment required

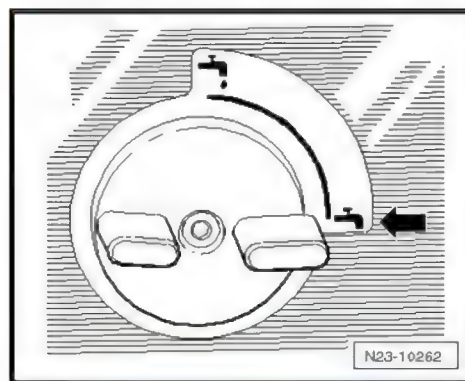
- ◆ Ultrasonic cleaning unit - VAS 6418-
- ◆ Mounting plate for injection modules - VAS 6418/1-
- ◆ Cleaning fluid - VAS 6418/2-

Cleaning

- Remove injectors  
⇒ ["5.3.2 Removing and installing injectors - vehicles with FSI engine", page 311](#) .
- Close drain tap -arrow- on ultrasonic cleaning unit - VAS 6418- (located on right side of housing).
- Fill ultrasonic unit with 2,120 ml of water which has been allowed to settle for a few minutes and cleaning fluid - VAS 6418/2- .

Mixture ratio for cleaning fluid

- 2,100 ml of tap water which has been allowed to settle for a few minutes and 20 ml of cleaning fluid - VAS 6418/2-

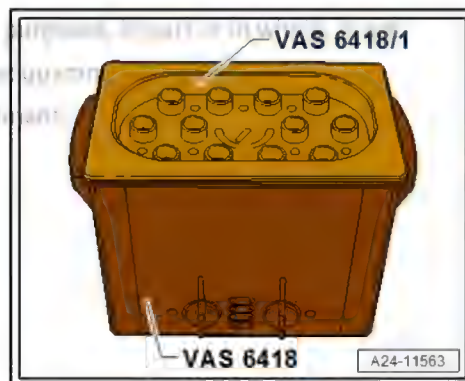


- Place mounting plate for injection modules - VAS 6418/1- on top of cleaning unit.


**⚠ WARNING**

*It is important to read the safety notes in the operating instructions before switching on the ultrasonic cleaning unit - VAS 6418- .*

*The ideal fluid level is approx. 1-4 mm above the base of the mounting plate. The ultrasonic cleaning unit - VAS 6418- can be damaged if the fluid level is too low.*



- Insert FSI injectors all the way into guides of mounting plate for injection modules - VAS 6418/1- .

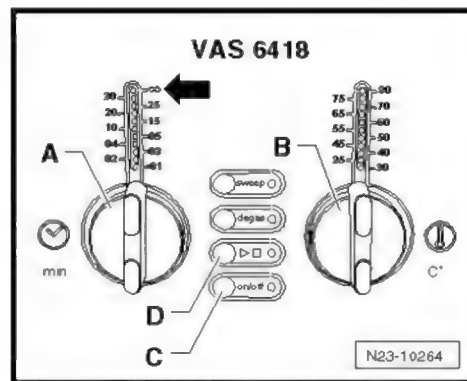
- Switch on cleaning unit by pressing **on/off** button -C-.
- Select a cleaning time of 30 minutes with rotary control -A-.
- Set rotary control -B- to a temperature of 50°C.
- Press  button -D- to start cleaning procedure.



#### Note

- ◆ *The temperature-controlled cleaning process is now started. While the fluid is being heated, the ultrasound is activated at intervals in order to circulate the cleaning solution. The ultrasound is activated continuously when the preselected temperature is reached.*
- ◆ *The actual cleaning process commences when the temperature reaches at least 50 °C and must last for at least 30 minutes.*

- Install injectors with new combustion chamber seal  
 ⇒ ["5.3.2 Removing and installing injectors - vehicles with FSI engine", page 311](#) .





## 6 Senders and sensors

⇒ ["6.1 Removing and installing intake air temperature sender G42 / intake manifold pressure sender G71", page 318](#)

⇒ ["6.2 Removing and installing fuel pressure sender G247", page 318](#)

⇒ ["6.3 Removing and installing fuel pressure sender for low pressure G410", page 319](#)

### 6.1 Removing and installing intake air temperature sender - G42- / intake manifold pressure sender - G71-

#### Removing

- Remove throttle valve module - J338-  
⇒ ["4.3 Removing and installing throttle valve module J338", page 301](#) .
- Unplug electrical connector -1-.
- Unscrew bolts -arrows- and detach intake air temperature sender - G42- / intake manifold pressure sender - G71- .



Note

Disregard -item 2-.

#### Installing

Installation is carried out in reverse order; note the following:



Note

Renew O-rings after removing.

- Install throttle valve module - J338-  
⇒ ["4.3 Removing and installing throttle valve module J338", page 301](#) .

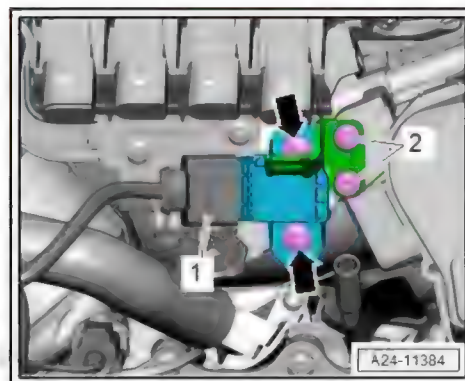
#### Tightening torques

- ♦ ⇒ ["1.1 Exploded view - supercharger", page 239](#)

### 6.2 Removing and installing fuel pressure sender - G247-

Special tools and workshop equipment required

- ♦ Assembly tool - T10118-




- ◆ Socket (27 mm) - T40218- or commercially available socket (27 mm)



#### Removing

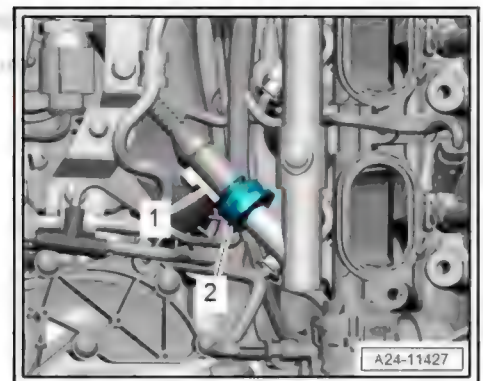
- Remove supercharger  
 ⇒ ["1.4 Removing and installing supercharger", page 244](#)
- Unplug electrical connector -1-

 **WARNING**

*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

- Put on safety goggles.
- Put on protective gloves.
- Release pressure (wrap a clean cloth around connection and open connection carefully).



- Unscrew fuel pressure sender - G247- -item 2-.

#### Installing

Installation is carried out in reverse order; note the following:

- Check tightening torque of connection before tightening fuel pressure sender.
- Install supercharger  
 ⇒ ["1.4 Removing and installing supercharger", page 244](#) .

#### Tightening torques

- ◆ ⇒ ["5.1 Exploded view - fuel rail with injectors", page 305](#)

### 6.3 Removing and installing fuel pressure sender for low pressure - G410-

#### Removing

- Remove supercharger  
 ⇒ ["1.4 Removing and installing supercharger", page 244](#) .



- Unplug electrical connector -2-.
- Unscrew fuel pressure sender for low-pressure - G410-  
-item 1-.

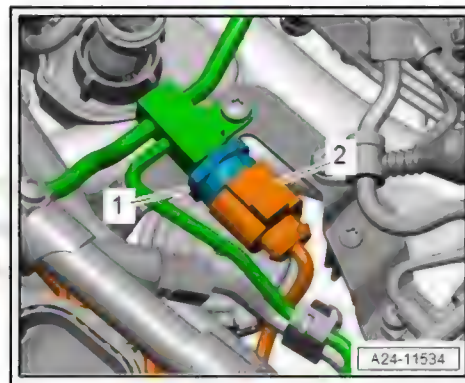
#### Installing

Installation is carried out in reverse order; note the following:

- Install supercharger  
⇒ ["1.4 Removing and installing supercharger", page 244](#).

#### Tightening torques

- ◆ ⇒ ["4.1 Exploded view - intake manifold \(bottom section\) with fuel rail", page 295](#)



## 7 High-pressure pump

⇒ "7.1 Exploded view - high-pressure pump", page 321

⇒ "7.2 Removing and installing high-pressure pump", page 322

⇒ "7.3 Removing and installing high-pressure pipe", page 326

### 7.1 Exploded view - high-pressure pump

#### 1 - Bolt

- ☐ Tightening torque and sequence  
⇒ Fig. "High-pressure pump - tightening torque and sequence", page 322

#### 2 - High-pressure pump

- ☐ With fuel metering valve - N290-
- ☐ Do not dismantle
- ☐ Removing and installing  
⇒ "7.2 Removing and installing high-pressure pump", page 322

#### 3 - Union nut

- ☐ Lubricate thread of union nut with fuel
- ☐ 27 Nm

#### 4 - O-ring

- ☐ Renew after removing

#### 5 - Bolt

- ☐ 9 Nm

#### 6 - Fuel supply hose with connection

- ☐ Low-pressure side leading from fuel tank

#### 7 - High-pressure pipe

- ☐ Removing and installing  
⇒ "7.3 Removing and installing high-pressure pipe", page 326

- ☐ Do not alter shape

- ☐ Check for damage before re-installing

#### 8 - Bolt

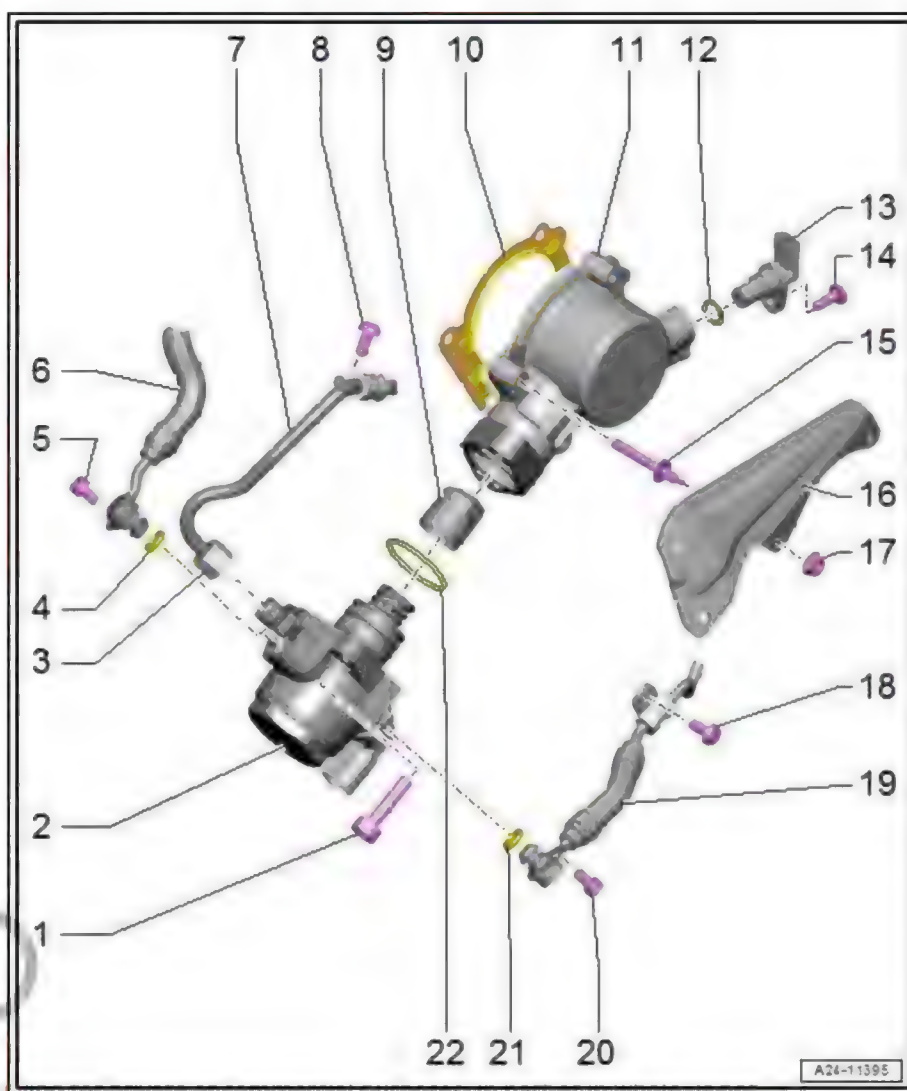
- ☐ 9 Nm

#### 9 - Roller tappet

- ☐ Can only be installed in one position
- ☐ Lubricate lightly with clean engine oil before installing

#### 10 - Gasket

- ☐ Renew after removing



11 - Housing

12 - O-ring

☐ Renew after removing

13 - Hall sender - G40-

☐ Removing and installing ⇒ ["1.5 Removing and installing Hall senders", page 379](#)

14 - Bolt

☐ Tightening torque ⇒ [Item 14 \(page 376\)](#)

15 - Threaded pin

☐ 9 Nm

16 - Protective plate

☐ For high-pressure pipe

17 - Nut

☐ 9 Nm

18 - Bolt

☐ 9 Nm

19 - Fuel supply hose with connection

☐ Low-pressure side to MPI injectors

☐ Removing and installing ⇒ ["4.5 Removing and installing fuel line", page 303](#)

20 - Bolt

☐ 9 Nm

21 - O-ring

☐ Renew after removing

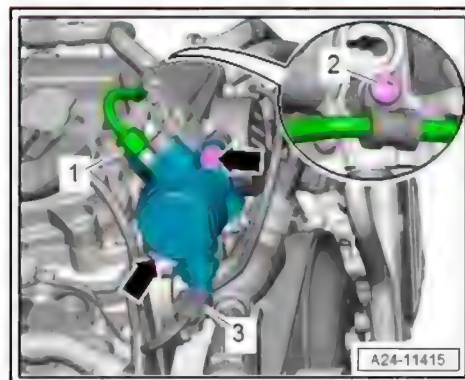
22 - O-ring

☐ Renew after removing

High-pressure pump - tightening torque and sequence

– Tighten bolts in stages as follows:

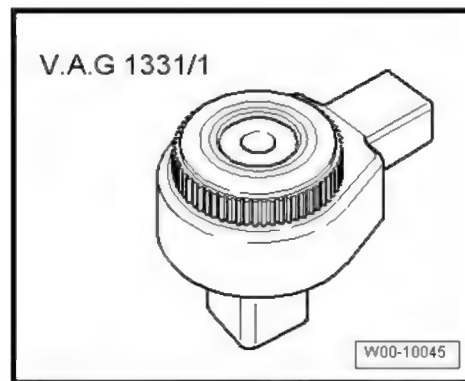
Stage	Bolts	Tightening torque
1.	-arrows-	Screw in by hand until contact is made
2.	-arrows-	Tighten in stages; final torque 20 Nm



## 7.2 Removing and installing high-pressure pump

Special tools and workshop equipment required

◆ Ratchet - V.A.G 1331/1-

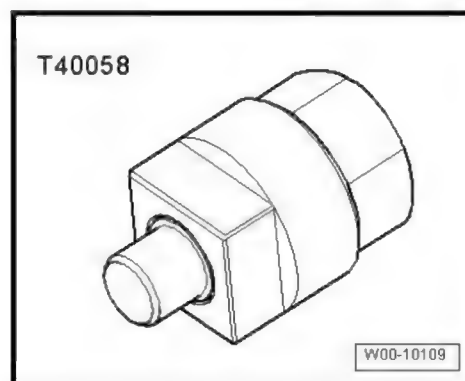


◆ Socket insert AF 14, flared ring spanner - V.A.G 1331/8-

◆ Engine bung set - VAS 6122-



◆ Adapter - T40058-



◆ Feeler gauge

Removing

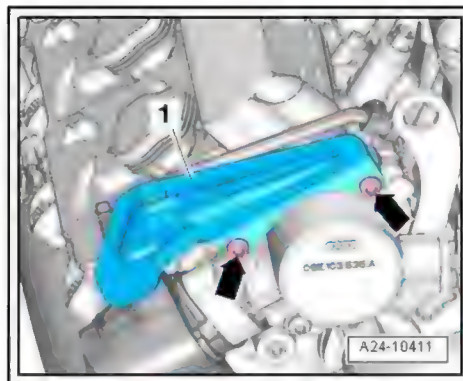


Note

- ◆ *The high-pressure pump should only be removed and installed when the engine is cold.*
- ◆ *When installing the high-pressure fuel pump, it is essential to ensure that no dirt enters the fuel system.*
- ◆ *Use a cloth to catch escaping fuel.*
- Remove air cleaner housing  
 ⇒ ["3.2 Removing and installing air cleaner housing", page 292](#) .



- Unscrew nuts -arrows- and remove guard plate -1-.



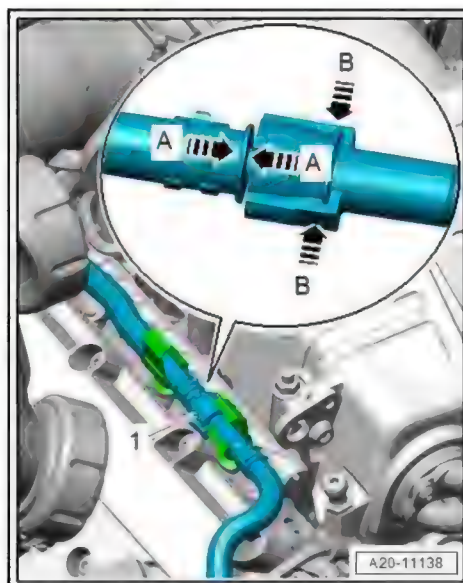
#### WARNING

*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

- Put on safety goggles.
- Put on protective gloves.
- Release pressure (wrap a clean cloth around connection and open connection carefully).

- Disconnect fuel hose -1- ⇒ Fuel supply system; Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .
- Seal off open lines and connections with plugs (thoroughly cleaned) from engine bung set - VAS 6122- .

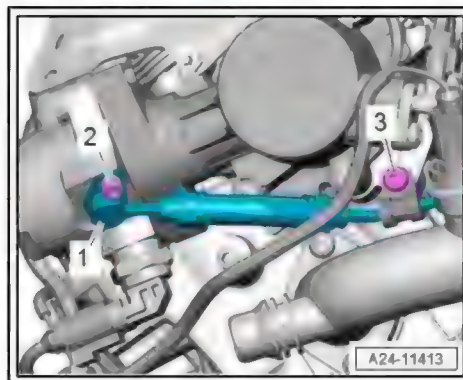


- Unscrew bolt -2- and detach connection -1-.



#### Note

*Disregard -item 3-.*

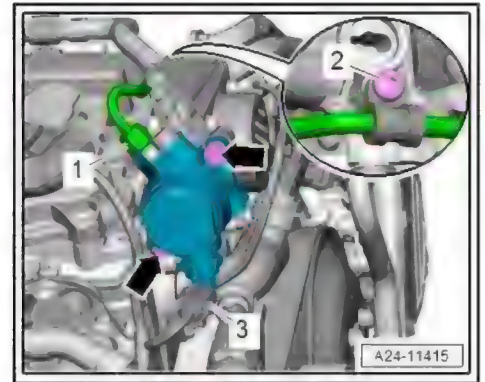


Protected by copyright. Copying for private or commercial purposes/for publication is not permitted unless authorised by AUDI AG. AUDI AG does not warrant the accuracy of the information with respect to the correctness of information in this document.

- Unplug electrical connector -3-.
- Remove bolt -2- on retaining clip.
- Remove union nut -1-.
- Remove bolts -arrows-.
- Carefully pull out high-pressure pump. It is possible that the roller tappet may remain lodged inside.

 Note

*Do not attempt to bend high-pressure pipe to a different shape.*



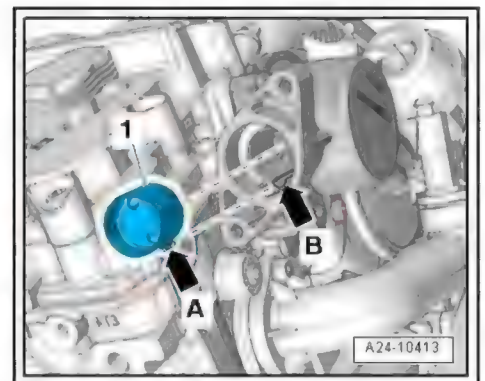
### Installing

Installation is carried out in reverse order; note the following:

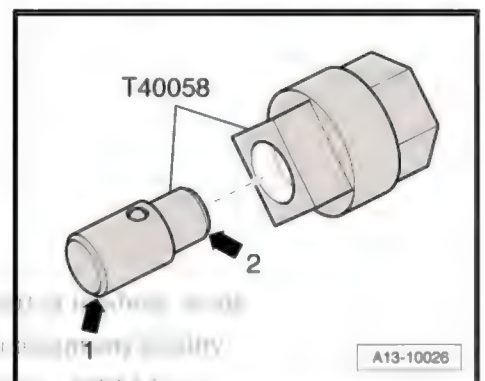
 Note

- ◆ *Renew O-ring after removal.*
- ◆ *The connections of the high-pressure pipe must not be damaged.*
- ◆ *Do not attempt to bend high-pressure pipe to a different shape.*

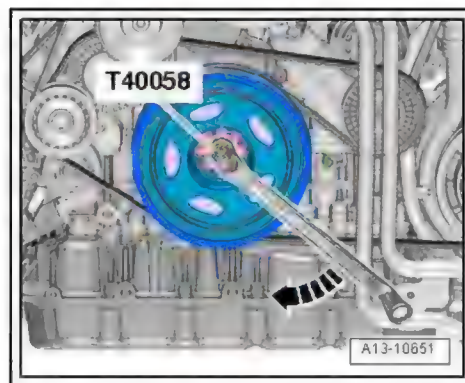
- Check roller tappet -1- for damage and renew if necessary.
- Lightly lubricate roller tappet with oil and insert it so that lug -arrow A- slides into guide notch -arrow B-.



- Insert guide pin of adapter -T40058- as follows:
  - The larger-diameter section -arrow 1- faces towards the engine.
  - The smaller-diameter section -arrow 2- faces the adapter.
- Remove noise insulation (front) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .



- Rotate crankshaft in direction of engine rotation -arrow- using adapter - T40058- and angled ring spanner, and at the same time press roller tappet into housing until it reaches lowest point.
- Only lift high-pressure pipe slightly to fit high-pressure pump.
- Press high-pressure pump down by hand as far as possible onto stop.
- At the same time, tighten securing bolts by hand.
- Tighten bolts; for procedure refer to  
⇒ Fig. "High-pressure pump - tightening torque and sequence", page 322 .
- Install high-pressure pipe  
⇒ "7.3 Removing and installing high-pressure pipe", page 326 .
- Install air cleaner housing  
⇒ "3.2 Removing and installing air cleaner housing", page 292 .
- Check fuel system for leaks  
⇒ "1.2 Checking fuel system for leaks", page 288 .



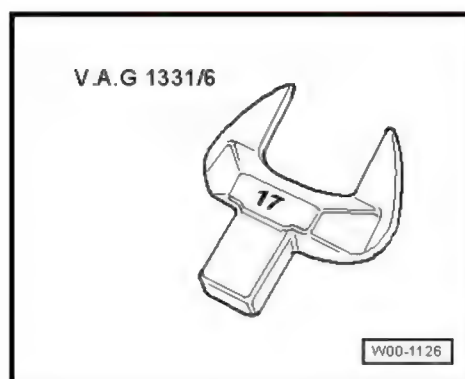
### Tightening torques

- ◆ ⇒ Fig. “High-pressure pump - tightening torque and sequence”, page 322
- ◆ ⇒ “7.1 Exploded view - high-pressure pump”, page 321
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

### 7.3 Removing and installing high-pressure pipe

### Special tools and workshop equipment required

- ◆ Open end spanner insert, AF 17 - V.A.G 1331/6-



Protected by copyright (©). Copying for private or commercial purposes, in part or in whole, is not permitted unless authorized by WUD AG. WUD AG does not guarantee weight and fatness, attributed to the contents of information in this document. Copyright by WUD AG.

## Removing

- Remove fuel line for MPI injection system  
 ⇒ "4.5 Removing and installing fuel line", page 303 .

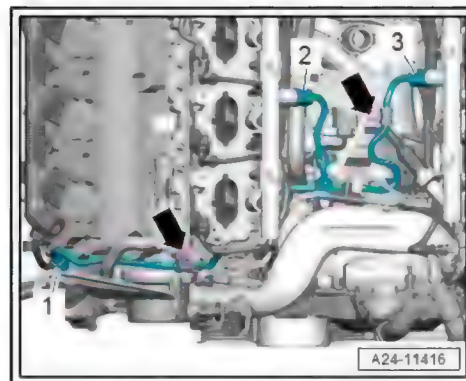


### WARNING

*The fuel system is pressurised.*

*Risk of injury as fuel may spray out.*

- Put on safety goggles.
- Put on protective gloves.
- Release pressure (wrap a clean cloth around connection and open connection carefully).



- Remove union nuts -1, 2, 3-. If necessary, counterhold threaded connection.
- Remove bolts -arrows-.



### Note

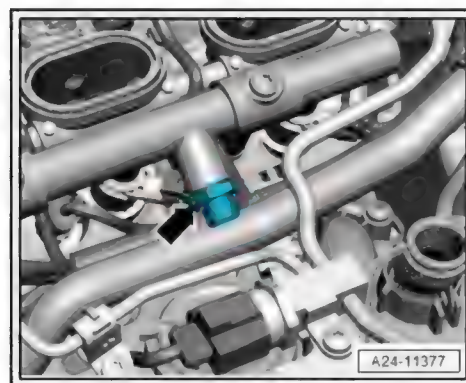
*Do not attempt to bend high-pressure pipe to a different shape.*

## Installing



### Note

- The connections of the high-pressure pipe must not be damaged.
- Do not attempt to bend high-pressure pipe to a different shape.
- If connection -arrow- has been unfastened or unbolted, it must be renewed.

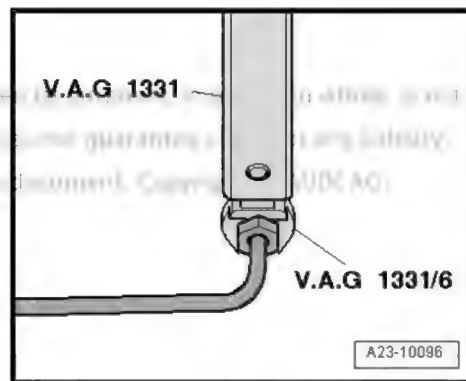


Produced by copyright: Copyright for printing or commercial purposes is not permitted without the written permission of AUDI AG. AUDI AG does not guarantee the correctness of the information in this document. Copyright © AUDI AG.

- First tighten union nut by hand until it makes contact, making sure that high-pressure pipe is not under tension.
- Tighten union nut with torque wrench -V.A.G 1331- and tool insert, AF 17 - V.A.G 1331/6- ; to do so, counterhold at hexagon flats of threaded connection on fuel rail with an open-end spanner.
- Do not tighten bolt for retainer until high-pressure pipe has been tightened.
- Install fuel line for MPI injection system  
⇒ ["4.5 Removing and installing fuel line", page 303](#) .

#### Tightening torques

- ◆ ⇒ ["4.1 Exploded view - intake manifold \(bottom section\) with fuel rail", page 295](#)
- ◆ ⇒ ["7.1 Exploded view - high-pressure pump", page 321](#)



## 8 Lambda probe

⇒ ["8.1 Exploded view - Lambda probe", page 329](#)

⇒ ["8.2 Removing and installing Lambda probe", page 330](#)

### 8.1 Exploded view - Lambda probe



#### Note

- ◆ *New Lambda probes are coated with an assembly paste.*
- ◆ *In the case of a used Lambda probe, coat only the thread with high-temperature paste; refer to ⇒ [Electronic parts catalogue for high-temperature paste](#).*
- ◆ *The assembly paste/high-temperature paste must not make contact with the slots on the Lambda probe body.*

#### 1 - Lambda probe 2 after catalytic converter - G131-

- ☐ With Lambda probe 2 heater after catalytic converter - Z30-
- ☐ Removing and installing  
⇒ ["8.2.2 Removing and installing Lambda probe G108 / G131", page 331](#)
- ☐ 55 Nm

#### 2 - Lambda probe 2 - G108-

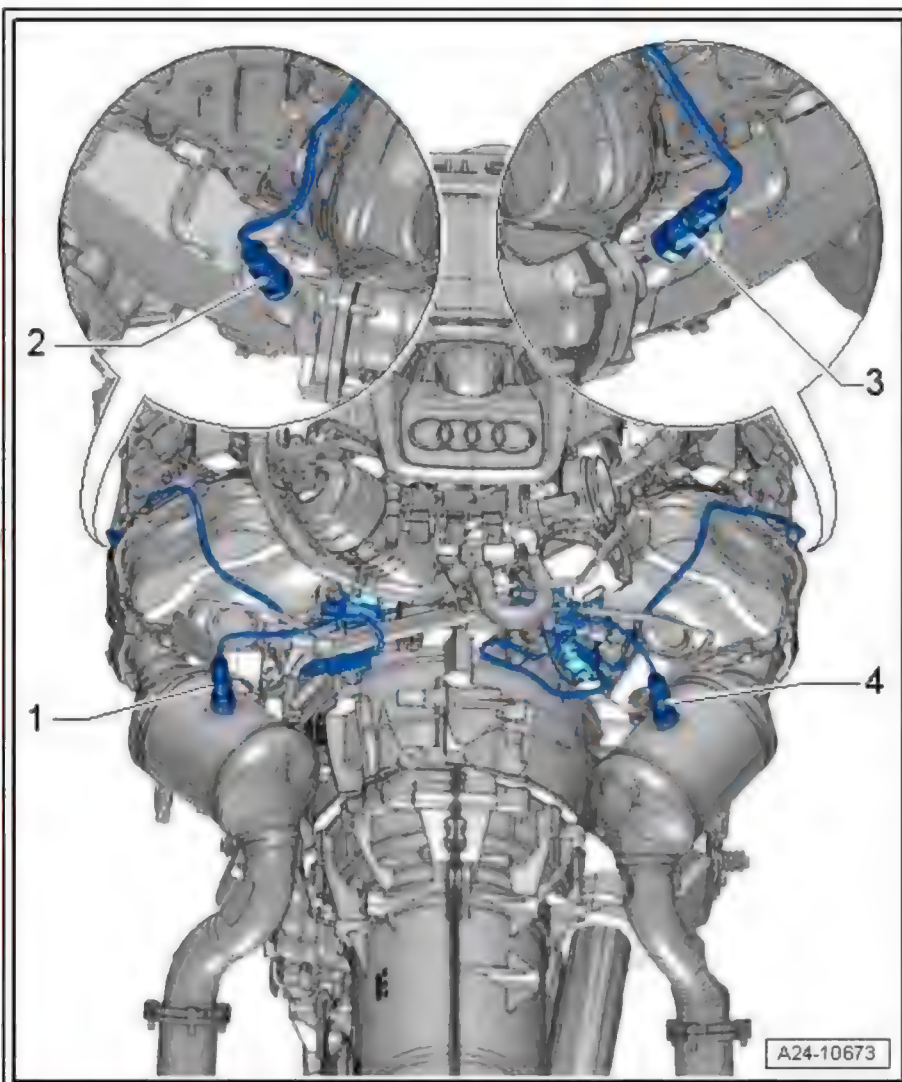
- ☐ With Lambda probe heater 2 - Z28-
- ☐ Removing and installing  
⇒ ["8.2.2 Removing and installing Lambda probe G108 / G131", page 331](#)
- ☐ 55 Nm

#### 3 - Lambda probe - G39-

- ☐ With Lambda probe heater - Z19-
- ☐ Removing and installing  
⇒ ["8.2.1 Removing and installing Lambda probe G39 / G130", page 330](#)
- ☐ 55 Nm

#### 4 - Lambda probe after catalytic converter - G130-

- ☐ With Lambda probe 1 heater after catalytic converter - Z29-
- ☐ Removing and installing  
⇒ ["8.2.1 Removing and installing Lambda probe G39 / G130", page 330](#)
- ☐ 55 Nm



## 8.2 Removing and installing Lambda probe

⇒ ["8.2.1 Removing and installing Lambda probe G39 / G130"](#),  
page 330

⇒ ["8.2.2 Removing and installing Lambda probe G108 / G131"](#),  
page 331

### 8.2.1 Removing and installing Lambda probe

**-G39-/ -G130-**

Special tools and workshop equipment required

◆ Lambda probe open ring spanner set - 3337-



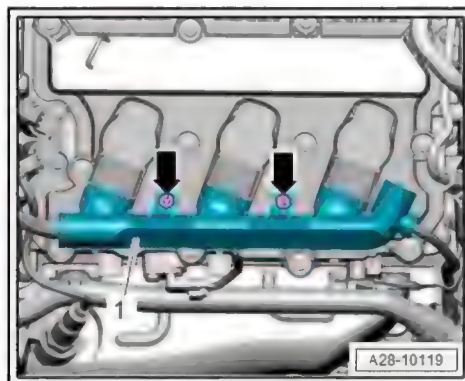
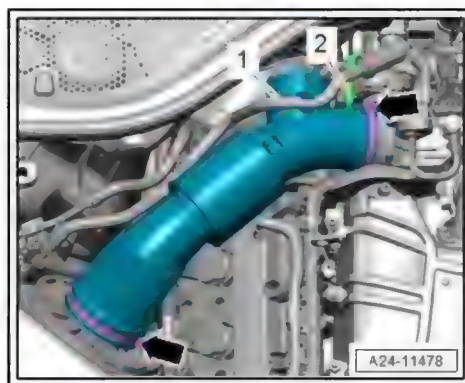
Removing



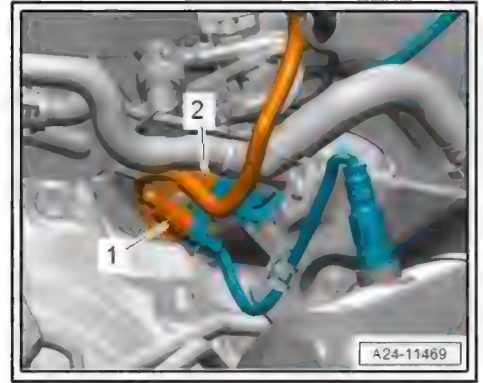
Note

*Re-install all cable ties in the same locations when installing.*

- Remove engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel"](#),  
page 43 .
- Move hose -1- for activated charcoal filter system clear at air pipe.
- Detach vacuum hose -2- from connection on air pipe.
- Loosen hose clips -arrows- and detach air pipe.
- Unscrew bolts -arrows- and unplug electrical connectors at ignition coils.
- Press electrical wiring harness -1- up slightly.



- Unplug corresponding electrical connector and move clear:
- 1 - For Lambda probe after catalytic converter - G130-
- 2 - For Lambda probe - G39-

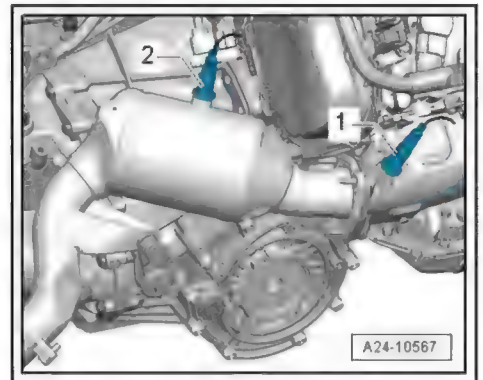


- Unscrew relevant Lambda probes:
- 1 - Lambda probe - G39- using ring spanner -3337/7-
- 2 - Lambda probe after catalytic converter - G130- using ring spanner -3337/2-



Note

*For illustration purposes, the installation position is shown with the engine removed.*



#### Installing

Installation is carried out in reverse order; note the following:



Note

- ◆ **New Lambda probes are coated with an assembly paste.**
- ◆ **If re-installing the old Lambda probes, coat the threads with high-temperature paste ⇒ Electronic parts catalogue.**
- ◆ **The assembly paste/high-temperature paste must not get into the slots on the Lambda probe body.**
- ◆ **When installing, the Lambda probe wire must always be reattached at the same locations to prevent it from coming into contact with the exhaust pipe.**

#### Tightening torques

- ◆ ⇒ ["8.1 Exploded view - Lambda probe", page 329](#)
- ◆ ⇒ ["1.1 Exploded view - ignition system", page 375](#)
- ◆ ⇒ ["2.2 Exploded view - hose connections for charge air system", page 275](#)

### 8.2.2 Removing and installing Lambda probe -G108- / -G131-

Special tools and workshop equipment required

# ♦ Lambda probe open ring spanner set - 3337-



Copyright by Audi AG. Copying for private or commercial use is prohibited. All rights reserved by Audi AG. Audi AG reserves the right to change the contents of this document without notice. Copyright by Audi AG.



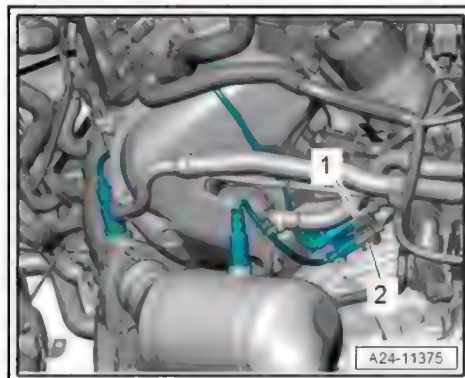
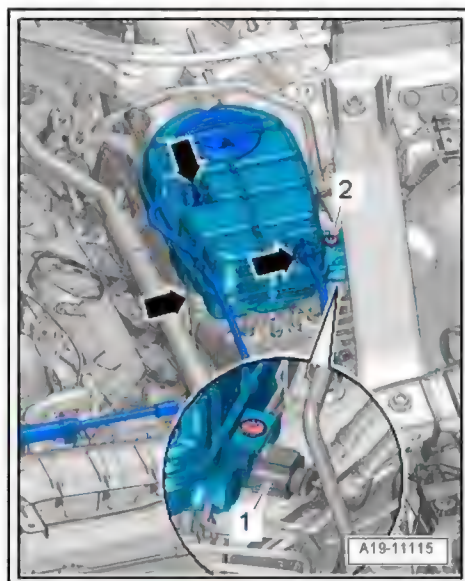
## Removing



### Note

Re-install all cable ties in the same locations when installing.

- Remove engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#).
  - Remove plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Exploded view - plenum chamber partition panel .
  - Unplug electrical connector -1-.
  - Remove bolt -2- and push coolant expansion tank to side with coolant hoses -arrows- connected.
  - Unplug relevant electrical connector and move electrical wiring clear:
- 1 - For Lambda probe 2 - G108-
  - 2 - For Lambda probe 2 - G131- (after catalytic converter)



– Unscrew relevant Lambda probe using ring spanner -3337/7- :

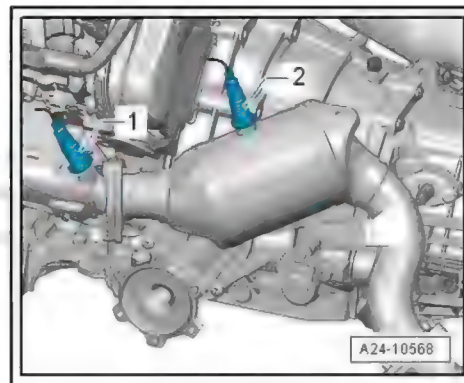
1 - Lambda probe 2 - G108-

2 - Lambda probe 2 after catalytic converter - G131-



Note

*For illustration purposes, the installation position is shown with the engine removed.*



#### Installing

Installation is carried out in reverse order; note the following:



Note

- ◆ *New Lambda probes are coated with an assembly paste.*
- ◆ *If re-installing the old Lambda probes, coat the threads with high-temperature paste ⇒ Electronic parts catalogue .*
- ◆ *The assembly paste/high-temperature paste must not get into the slots on the Lambda probe body.*
- ◆ *When installing, the Lambda probe wire must always be reattached at the same locations to prevent it from coming into contact with the exhaust pipe.*

– Install engine cover panel

⇒ ["3.1 Removing and installing engine cover panel", page 43](#) .

#### Tightening torques

- ◆ ⇒ ["8.1 Exploded view - Lambda probe", page 329](#)

## 9 Engine control unit

⇒ "9.1 Removing and installing engine/motor control unit J623",  
page 334

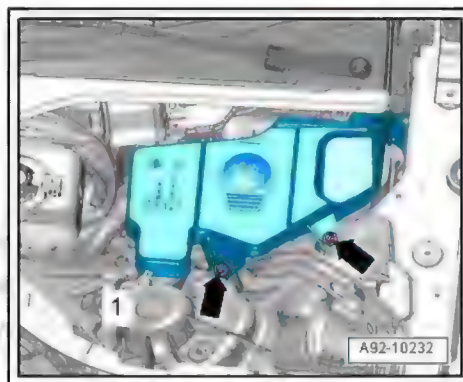
### 9.1 Removing and installing engine/motor control unit - J623-

#### Removing

- When renewing engine control unit, select diagnosis object "Replace engine control unit" in "Guided Functions" mode of ⇒ Vehicle diagnostic tester.
- Switch off ignition.
- Remove plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .
- Unscrew bolts -arrows- and pull filler neck out of washer fluid reservoir and through opening in body to right side.



Printed and reproduced by Audi AG. Copying for private use is permitted. Audi AG does not guarantee the correctness of information in this document. Copy



- Release catch -arrow- and detach engine control unit - J623-item 1-.



Note

Disregard -item 2-.

#### Installing

Installation is carried out in reverse order; note the following:

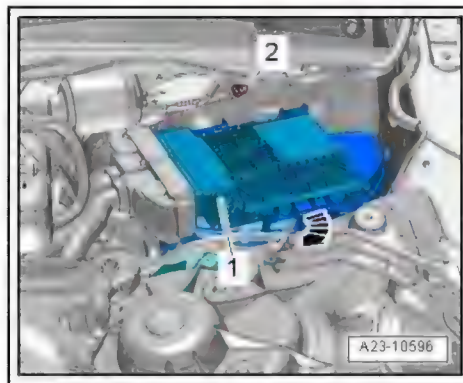
- Install plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .

After installing a new engine control unit, the following operation must be performed:

- Activate engine control unit using ⇒ Vehicle diagnostic tester in "Guided Functions" mode, "Replace engine control unit".

#### Tightening torques

- ♦ Filler neck for washer fluid reservoir ⇒ Electrical system; Rep. gr. 92 ; Windscreen washer system; Exploded view - windscreen washer system



## 26 – Exhaust system

### 1 Exhaust pipes/silencers

⇒ "1.1 Exploded view - silencers", page 335

⇒ "1.2 Separating exhaust pipes/silencers", page 337

⇒ "1.3 Removing and installing front silencers", page 339

⇒ "1.5 Stress-free alignment of exhaust system", page 340

⇒ "1.6 Checking exhaust system for leaks", page 341

#### 1.1 Exploded view - silencers

##### 1 - Bolt

- ☐ 20 Nm

##### 2 - Mounting

- ☐ Renew if damaged
- ☐ Check preload  
⇒ "1.5 Stress-free alignment of exhaust system", page 340

##### 3 - Nut

- ☐ 23 Nm

##### 4 - Clamp (front)

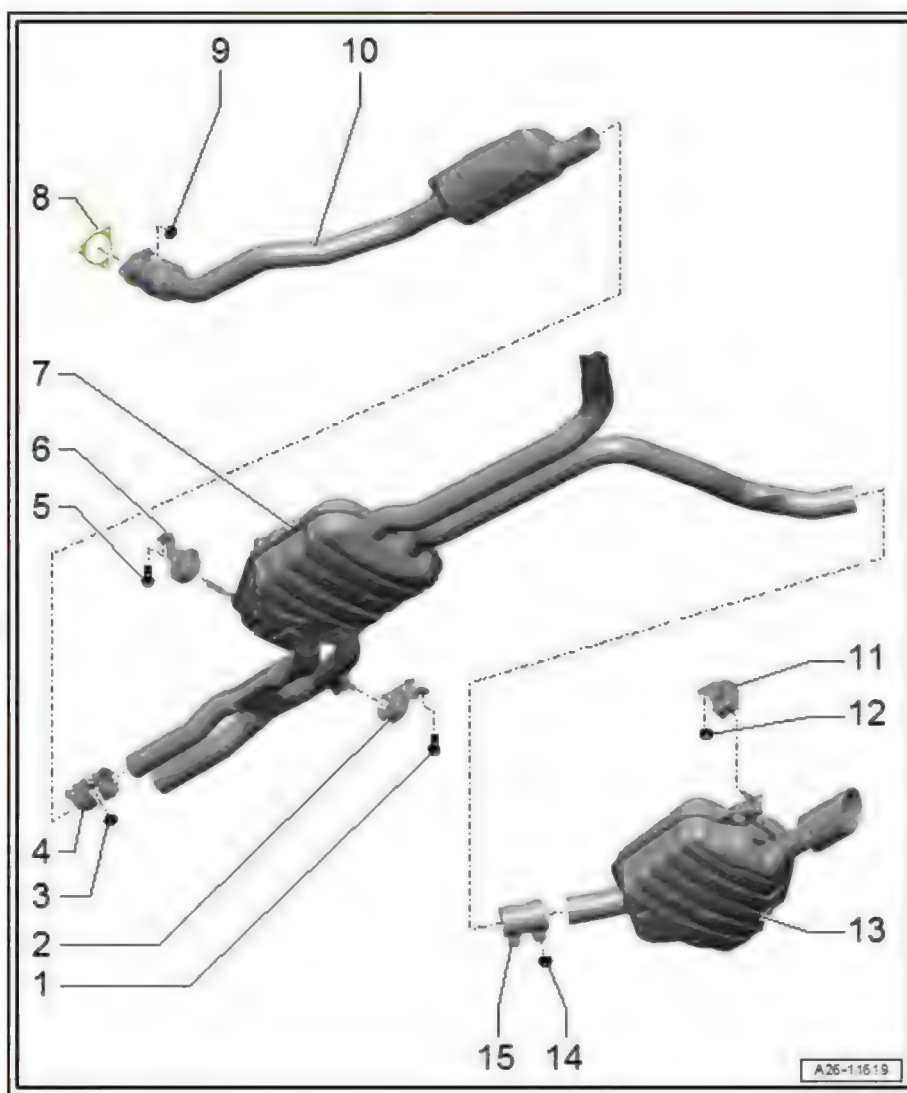
- ☐ Installation position  
⇒ Fig. "Installation position of front clamps", page 336
- ☐ Push onto front silencer as far as stop
- ☐ Before tightening, align exhaust system so it is free of stress  
⇒ "1.5 Stress-free alignment of exhaust system", page 340
- ☐ Tighten bolted connections evenly

##### 5 - Bolt

- ☐ 20 Nm

##### 6 - Mounting

- ☐ Renew if damaged
- ☐ Check preload  
⇒ "1.5 Stress-free alignment of exhaust system", page 340



##### 7 - Centre silencer

- ☐ Combined in one unit with rear silencers as original equipment. Can be renewed separately for repair purposes
- ☐ Remove diagonal struts prior to removal if necessary ⇒ Fig. "Diagonal struts (Audi A7)", page 337
- ☐ Cutting point ⇒ "1.2 Separating exhaust pipes/silencers", page 337
- ☐ Align exhaust system so it is free of stress ⇒ "1.5 Stress-free alignment of exhaust system", page 340

## 8 - Gasket

- ☐ Renew after removing

## 9 - Nut

- ☐ Renew after removing
- ☐ 23 Nm

## 10 - Front silencer

- ☐ With flexible joint; do not bend flexible joint more than 10° – otherwise it can be damaged
- ☐ Removing and installing ⇒ [“1.3 Removing and installing front silencers”, page 339](#)
- ☐ Align exhaust system so it is free of stress ⇒ [“1.5 Stress-free alignment of exhaust system”, page 340](#)

## 11 - Mounting

- ☐ Renew if damaged
- ☐ Check preload ⇒ [“1.5 Stress-free alignment of exhaust system”, page 340](#)

## 12 - Nut

- ☐ 23 Nm

## 13 - Rear silencer

- ☐ Combined as one unit with centre silencer as original equipment
- ☐ Centre silencer and rear silencer can be renewed separately
- ☐ Remove diagonal struts prior to removal if necessary ⇒ [Fig. ““Diagonal struts \(Audi A7\)””, page 337](#)
- ☐ Cutting point between centre silencer and rear silencer  
⇒ [“1.2 Separating exhaust pipes/silencers”, page 337](#)
- ☐ Align exhaust system so it is free of stress ⇒ [“1.5 Stress-free alignment of exhaust system”, page 340](#)

## 14 - Nut

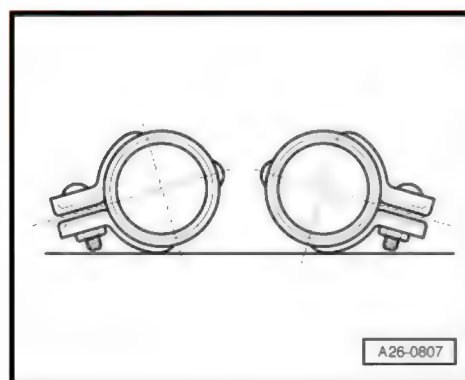
- ☐ 23 Nm

## 15 - Clamp (rear)

- ☐ For separate replacement of centre and rear silencers
- ☐ Installation position ⇒ [Fig. ““Installation position of rear clamps””, page 337](#)
- ☐ Before tightening, align exhaust system so it is free of stress  
⇒ [“1.5 Stress-free alignment of exhaust system”, page 340](#)
- ☐ Tighten bolted connections evenly

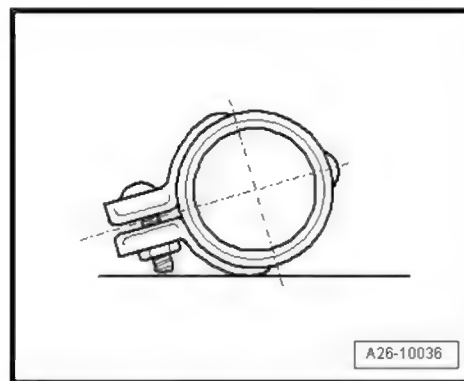
## Installation position of front clamps

- Install clamps so that the bolt ends do not protrude beyond bottom of clamp.
- Installation position: bolted connections face outwards.



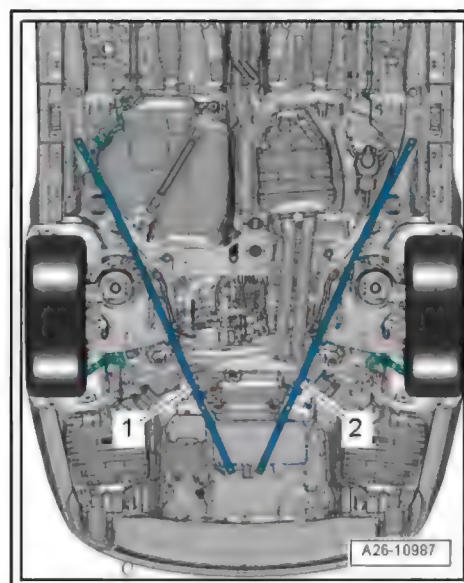
#### Installation position of rear clamps

- Install clamps so that the bolt ends do not protrude beyond bottom of clamp.
- Installation position: bolted connections face forwards.



#### Diagonal struts (Audi A7)

- Remove diagonal struts -1- and -2- when removing centre silencer and rear silencer unit.
- Install diagonal struts ⇒ Running gear, axles, steering; Rep. gr. 42 ; Subframe; Exploded view - subframe .



## 1.2 Separating exhaust pipes/silencers

- ◆ The connecting pipe can be cut through at the cutting point in order to renew the centre or rear silencer separately.
- ◆ The cutting point is marked by an indentation on the circumference of the exhaust pipe.

#### Special tools and workshop equipment required

- ◆ Chain pipe cutter - VAS 6254-



Illustrated by equipment is subject to change without notice. The equipment is not intended for use in any other way than for the purpose for which it was designed. The equipment is not intended for use in any other way than for the purpose for which it was designed. The equipment is not intended for use in any other way than for the purpose for which it was designed.

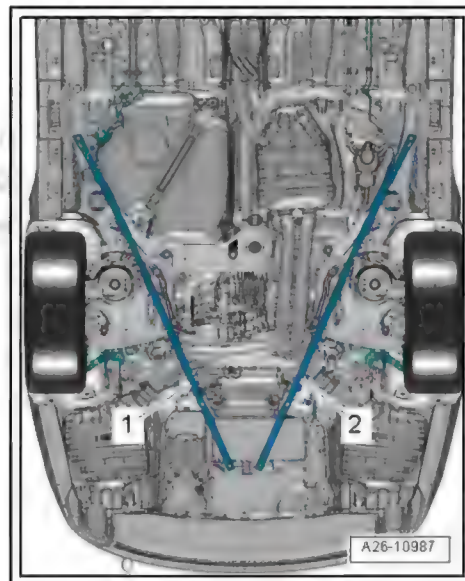




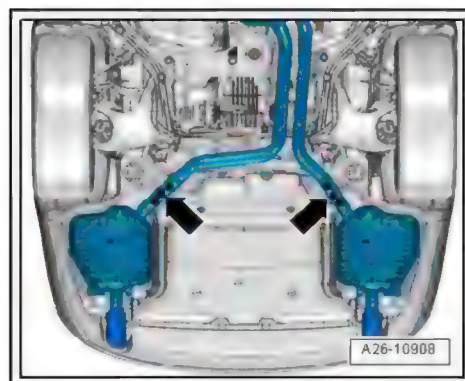
## Procedure

- Audi A7: Remove bolts on both sides and detach diagonal struts -1- and -2-.

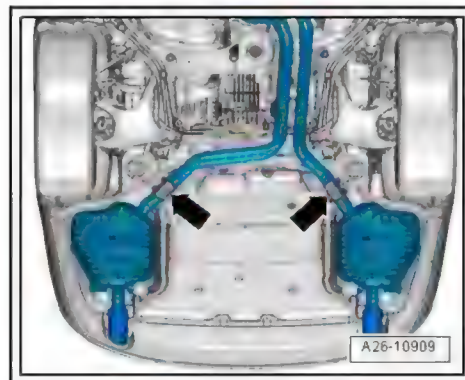
Information to owners: Details for points of permitted access authorized by AUDI AG. Also see the instructions for the use of the vehicle.



- Cut through exhaust pipes at right angles at the positions marked -arrows- using chain pipe cutter - VAS 6254- .



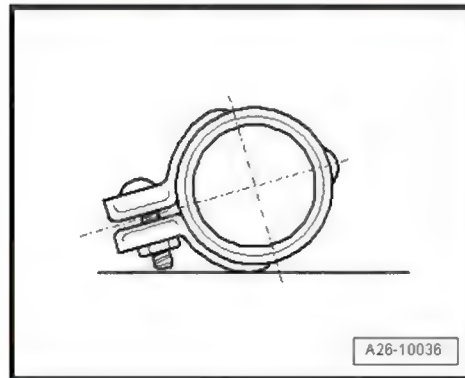
- Position centre of clamps -arrows- over cutting location.



- Install clamps so that the bolt ends do not protrude beyond bottom of clamp.
- Installation position: bolted connections face forwards.
- Align the exhaust system so it is free of stress  
⇒ ["1.5 Stress-free alignment of exhaust system", page 340](#) .

## Tightening torques

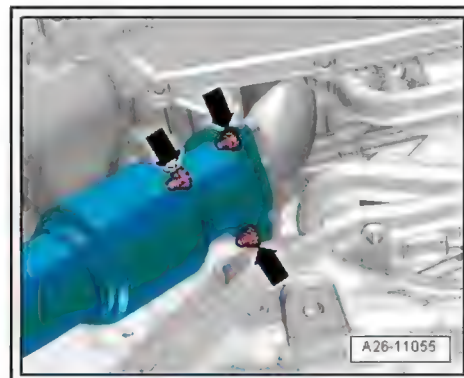
- ◆ ⇒ ["1.1 Exploded view - silencers", page 335](#)
- ◆ Diagonal struts ⇒ Running gear, axles, steering; Rep. gr. 42 ; Subframe; Exploded view - subframe



## 1.3 Removing and installing front silencers

### Removing

- Remove noise insulation (rear) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Unscrew nuts -arrows- for relevant front silencer.



### Caution

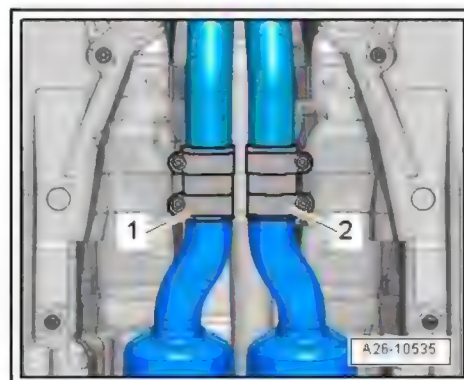
*Risk of damage to flexible joints in front silencer.*

- ◆ *Do NOT bend the flexible joint in the front silencer more than 10°.*

- Release and push back clamp -1- or -2- and detach relevant front silencer.

### Installing

Installation is carried out in reverse order; note the following:



### Note

*Renew gaskets and self-locking nuts after removal.*

- Align the exhaust system so it is free of stress  
⇒ ["1.5 Stress-free alignment of exhaust system", page 340](#) .

### Tightening torques

- ◆ ⇒ ["1.1 Exploded view - silencers", page 335](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorized by AUDI AG. AUDI AG disclaims any liability for damage, whether caused by negligence or otherwise, arising from the use of this document. Copyright by AUDI AG.

## 1.4 Removing and installing silencers

### Removing

- Audi A7: Remove diagonal struts ⇒ Running gear, axles, steering; Rep. gr. 42 ; Subframe; Exploded view - subframe .

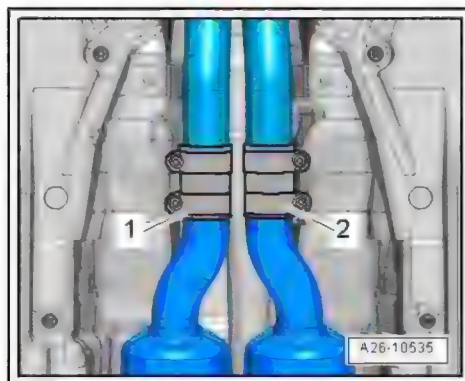


#### Caution

*Risk of damage to flexible joints in front silencer.*

- ◆ *Do NOT bend the flexible joint in the front silencer more than 10°.*

- Release clamps -1 and 2- and push to rear.



#### WARNING

*Risk of accident caused by weight of silencer.*

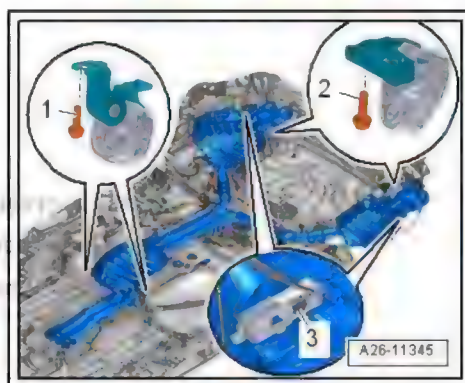
- ◆ *A second mechanic is required for removal of the silencer.*

- Unscrew bolts -1, 2- and remove silencers.



#### Note

*Disregard -item 3-.*



### Installing

Installation is carried out in reverse order; note the following:



#### Note

*Renew gaskets and self-locking nuts after removal.*

- Align the exhaust system so it is free of stress  
⇒ ["1.5 Stress-free alignment of exhaust system", page 340](#) .

### Tightening torques

- ◆ ⇒ ["1.1 Exploded view - silencers", page 335](#)
- ◆ Diagonal struts ⇒ Running gear, axles, steering; Rep. gr. 42 ; Subframe; Exploded view - subframe

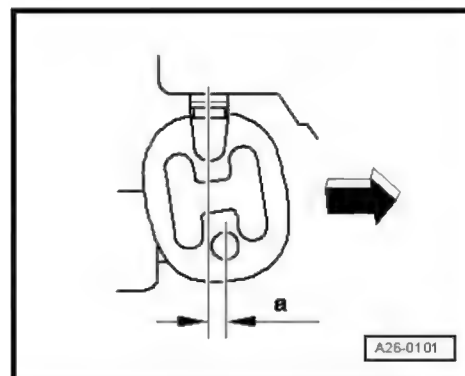
## 1.5 Stress-free alignment of exhaust system

### Procedure

- The exhaust system must be aligned when it is cool.

Vehicles without clamps between centre silencer and rear silencers

- Loosen bolted connections on front clamps.
- Push exhaust system towards front of vehicle -arrow- until mountings in front of centre silencer are preloaded by  $-a = 6 \dots 10 \text{ mm}$ .
- Tighten bolted connections on clamps evenly.
- Align tailpipes ⇒ [page 341](#) .



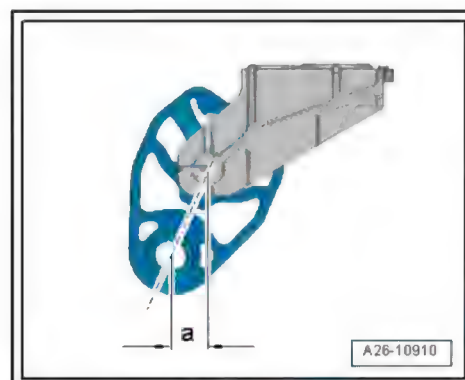
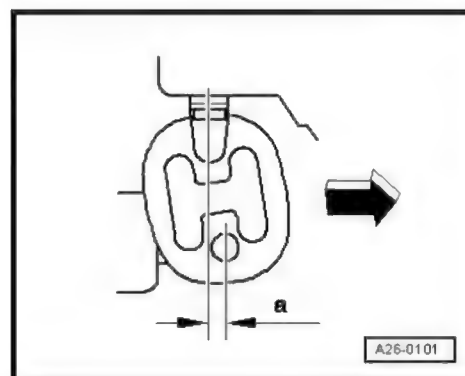
Vehicles with clamps between centre silencer and rear silencers



Note

*On a vehicle with clamps fitted between the centre silencer and rear silencers, it is also necessary to align the centre silencer.*

- Loosen bolted connections on front and rear clamps.
- Push exhaust system towards front of vehicle -arrow- until mountings in front of centre silencer are preloaded by  $-a = 6 \dots 10 \text{ mm}$ .
- Tighten bolted connections on front clamps evenly.
- Push rear section of exhaust system towards front of vehicle -arrow-, so that mountings (rear) for rear silencers are preloaded by  $-a = 11 \dots 15 \text{ mm}$ .
- Align rear silencers so they are horizontal.
- Tighten bolted connections on rear clamps evenly.
- Align tailpipes ⇒ [page 341](#) .

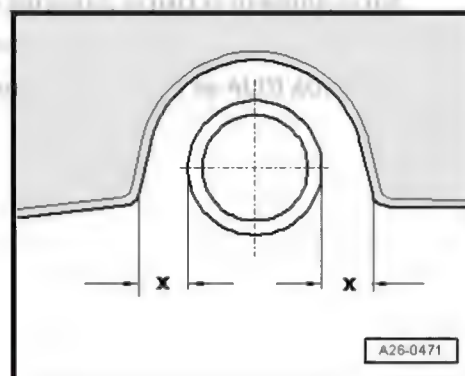


Aligning tailpipes

- Check clearance between tailpipes and bumper on both sides:
  - Dimension  $-x-$  (left-side) = dimension  $-x-$  (right-side)

Tightening torques

- ◆ ⇒ ["1.1 Exploded view - silencers", page 335](#)



## 1.6 Checking exhaust system for leaks

- Start the engine and run at idling speed.
- Plug tailpipes during leak test (e.g. with cloth or plugs).



- Listen for noise at connections between cylinder head/exhaust manifold, exhaust manifold/front exhaust pipe, etc. to locate any leaks.
- Rectify any leaks that are found.



## 2 Emission control system

⇒ ["2.1 Exploded view - emission control system", page 343](#)

⇒ ["2.2 Removing and installing catalytic converter", page 344](#)

### 2.1 Exploded view - emission control system

#### 1 - Catalytic converter

- ☐ Protect against knocks and impact
- ☐ Removing and installing  
⇒ ["2.2 Removing and installing catalytic converter", page 344](#)
- ☐ Mounting components  
⇒ [Fig. "Components of mountings for catalytic converter", page 344](#)

#### 2 - Gasket

- ☐ Renew after removing

#### 3 - Exhaust manifold

- ☐ Removing and installing  
⇒ ["4.2 Removing and installing exhaust manifold", page 366](#)

#### 4 - Nut

- ☐ Renew after removing
- ☐ Coat thread with high-temperature paste; for high-temperature paste refer to ⇒ Electronic parts catalogue
- ☐ 23 Nm

#### 5 - Gasket

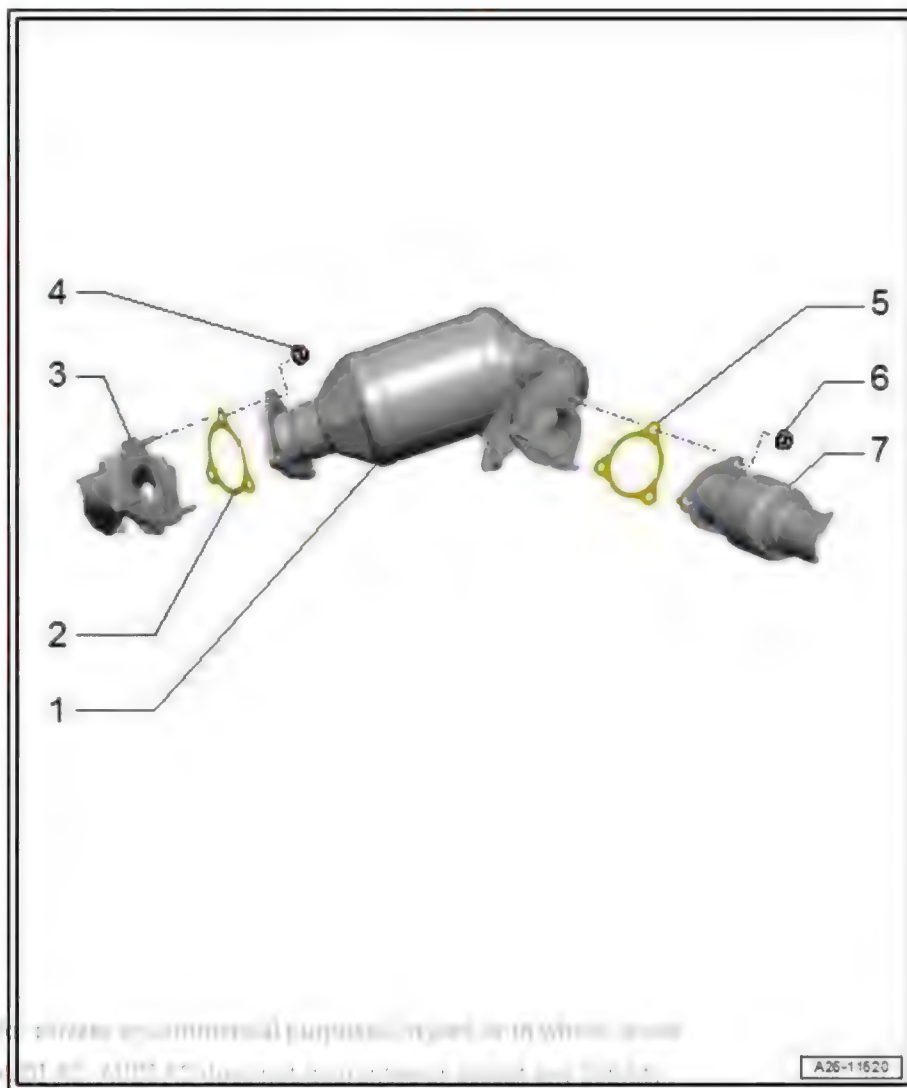
- ☐ Renew after removing

#### 6 - Nut

- ☐ Tightening torque  
⇒ [Item 9 \(page 336\)](#)

#### 7 - Front silencer

- ☐ With flexible joint; do not bend flexible joint more than 10° – otherwise it can be damaged
- ☐ Removing and installing ⇒ ["1.3 Removing and installing front silencers", page 339](#)
- ☐ Align exhaust system so it is free of stress ⇒ ["1.5 Stress-free alignment of exhaust system", page 340](#)



A26-11620



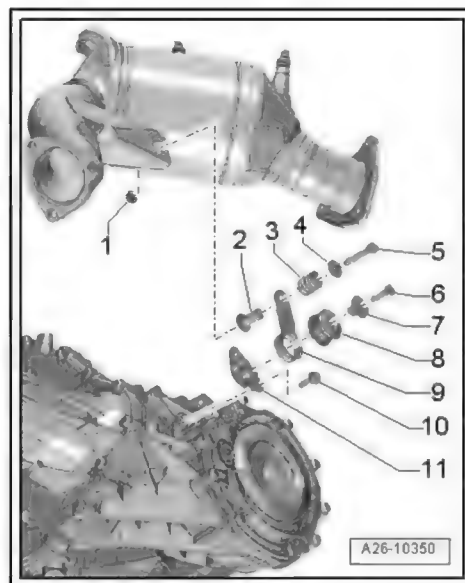
#### Components of mountings for catalytic converter

- 1 - Nut, 23 Nm
- 2 - Spacer sleeve
- 3 - Compression spring
- 4 - Washer
- 5 - Bolt
- 6 - Bolt, 23 Nm
- 7 - Spacer sleeve
- 8 - Buffer
- 9 - Bracket
- 10 - Bolt, 23 Nm
- 11 - Bracket



#### Note

*The illustration shows the mountings on the right side as an example.*



## 2.2 Removing and installing catalytic converter

⇒ ["2.2.1 Removing and installing catalytic converter \(left-side\)", page 344](#)

⇒ ["2.2.2 Removing and installing catalytic converter \(right-side\)", page 348](#)

### 2.2.1 Removing and installing catalytic converter (left-side)

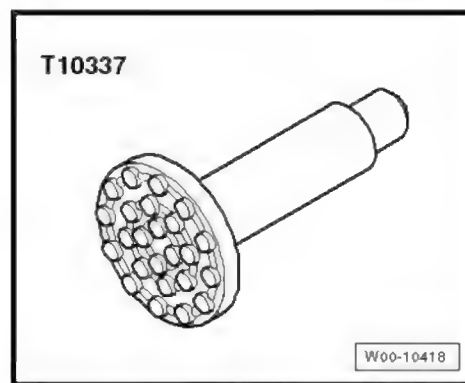
Special tools and workshop equipment required

- ◆ Engine and gearbox jack - VAS 6931-



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorized by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of the information in this document. Copyright by AUDI AG.

◆ Gearbox support - T10337-



Removing



Note

*Re-install all cable ties in the same locations when installing.*

- Remove Lambda probe 2 after catalytic converter - G131-  
⇒ ["8.2.2 Removing and installing Lambda probe G108 / G131", page 331](#).
- Remove subframe cross brace ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Removing and installing subframe cross brace .



Caution

*Risk of damage to running gear components.*

- ◆ *The vehicle must NOT be lowered onto its wheels if the engine/gearbox mountings, steering rack or subframe cross brace are not properly installed.*

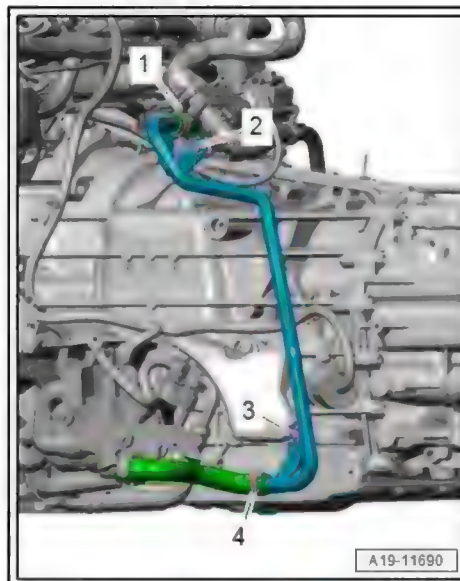
- Remove front silencer (left-side)  
⇒ ["1.3 Removing and installing front silencers", page 339](#) .
- Remove wheel housing liner (front left) ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Removing and installing wheel housing liner (front) .
- Detach intermediate steering shaft from steering rack and move clear by sliding splines together ⇒ Running gear, axles, steering; Rep. gr. 48 ; Steering column; Removing and installing intermediate steering shaft .

- Remove bolt -2- and nut -3- and push coolant pipe (left-side) on gearbox clear to side.

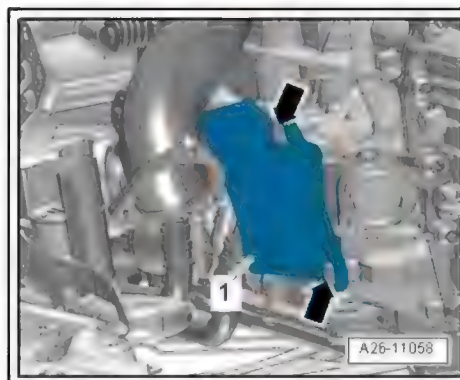


Note

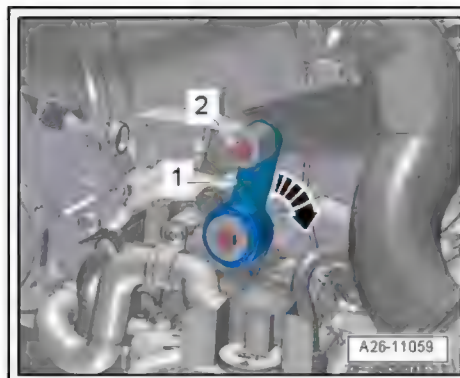
Disregard -items 1, 4-.



- Unscrew bolts -arrows- and remove cover -1- from side of gearbox.



- Loosen bolted connection -2- and swivel bracket -1- to rear -arrow-.



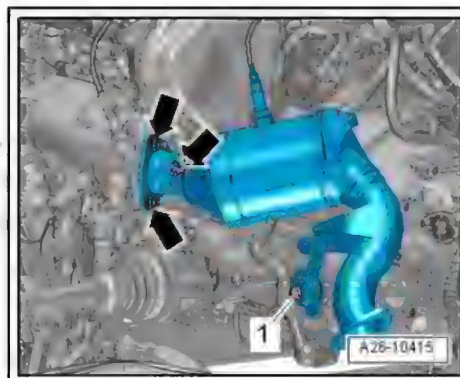
- Remove nuts -arrows-.



Note

Protected by copyright. Copying for private or commercial purposes, without permission, is prohibited unless authorised by AUDI AG. AUDI AG does not guarantee the correctness of information in this document. Copying is prohibited.

Disregard -item 1-.



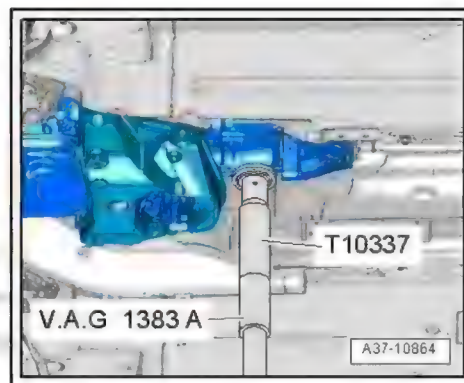
- Fit gearbox support - T10337- onto engine and gearbox jack and position underneath gearbox.
- Raise gearbox slightly using engine and gearbox jack.



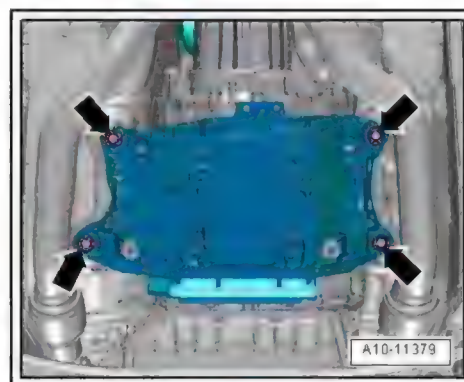
**WARNING**

**Risk of accident.**

- ◆ *Engine and gearbox jack must remain in position when work is being carried out and must not be left unattended under the vehicle.*



- Remove bolts -arrows- for tunnel cross member.



- Lower tunnel cross member as far as distance -a- using engine and gearbox jack - VAS 6931- .
- Dimension -a- = 70 mm (maximum).
- Detach catalytic converter (left-side).

#### Installing

Installation is carried out in reverse order; note the following:



#### Note

*Renew gaskets and self-locking nuts after removal.*

- Install intermediate steering shaft ⇒ Running gear, axles, steering; Rep. gr. 48 ; Steering column; Removing and installing intermediate steering shaft .
- Install Lambda probe 2 after catalytic converter - G131-  
⇒ ["8.2.2 Removing and installing Lambda probe G108 / G131"](#), [page 331](#) .

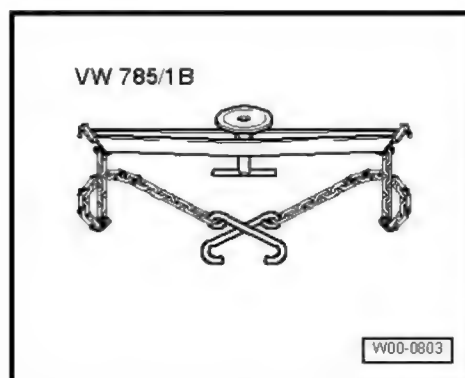
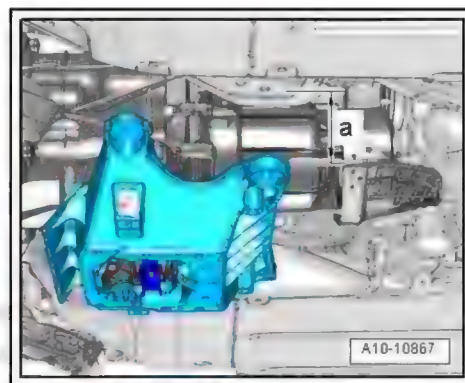
#### Tightening torques

- ◆ ⇒ ["1.1 Exploded view - silencers"](#), [page 335](#)
- ◆ Subframe cross brace ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Exploded view - subframe
- ◆ Tunnel cross member ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings / ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front)
- ◆ Cover to gearbox ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; ATF circuit; Exploded view - ATF circuit / ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; ATF circuit; Exploded view - ATF circuit
- ◆ ⇒ ["3.1 Exploded view - coolant pipes"](#), [page 205](#)

### 2.2.2 Removing and installing catalytic converter (right-side)

Special tools and workshop equipment required

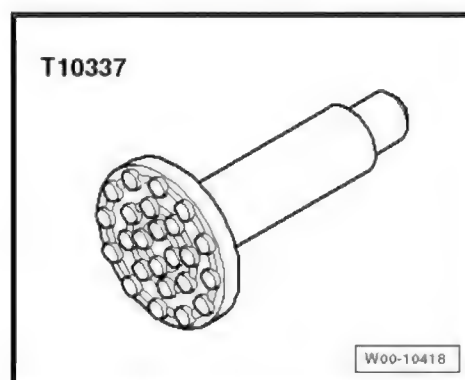
- ◆ Retaining tool - VW 785/1B-



◆ Engine and gearbox jack - VAS 6931-



◆ Gearbox support - T10337-



## Removing



### Note

*Re-install all cable ties in the same locations when installing.*

- Remove front silencer (right-side)  
⇒ ["1.3 Removing and installing front silencers", page 339](#) .
- Remove subframe cross brace ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Removing and installing subframe cross brace .



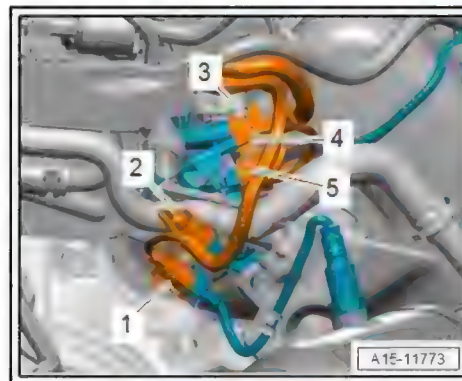
### Caution

*Risk of damage to running gear components.*

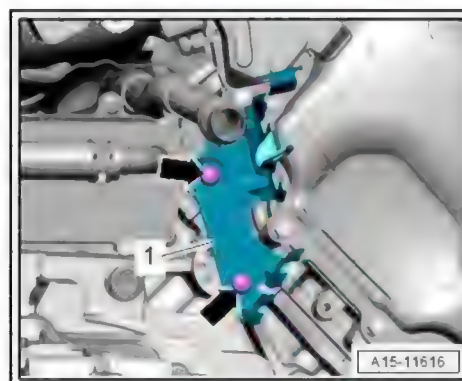
- ◆ *The vehicle must NOT be lowered onto its wheels if the engine/gearbox mountings, steering rack or subframe cross brace are not properly installed.*

- Remove throttle valve module - J338-  
⇒ ["4.3 Removing and installing throttle valve module J338", page 301](#) .
- Remove coolant pipe from right side of gearbox  
⇒ ["3.2.8 Removing and installing coolant pipe \(right-side\) on gearbox", page 220](#) .
- Remove Lambda probe after catalytic converter - G130-  
⇒ ["8.2.1 Removing and installing Lambda probe G39 / G130", page 330](#) .

- Detach electrical connectors -1 ... 5- from bracket and place to one side.

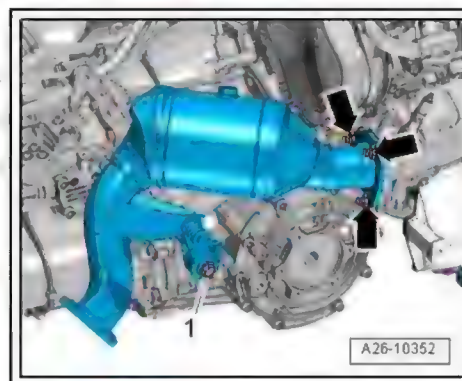


- Unscrew bolts -arrows- and detach bracket -1-.

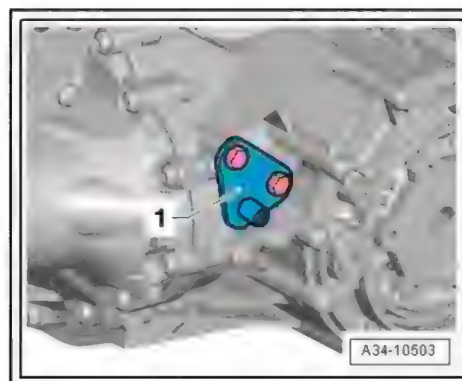


- Remove nuts -arrows- and bolt -1- and move catalytic converter (right-side) towards rear.

Protected by copyright. Copying for private or commercial use is not permitted unless authorised by AUDI AG. AUDI AG does not accept any liability with respect to the correctness of information in this document.



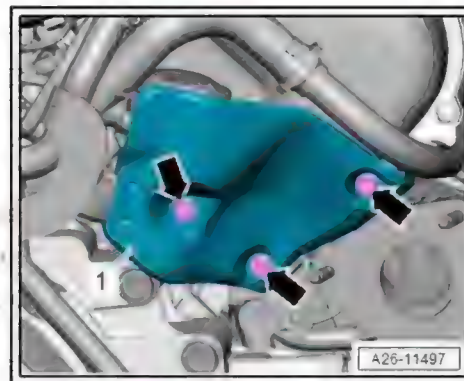
- Remove bolts and detach retainer -1- for bracket for exhaust system.



- Remove bolts -arrows- and detach heat shield -1-.



intended for internal use only. It is not to be used for any other purpose.  
The information is provided by AUDI AG. AUDI AG does not accept any  
responsibility for the use of the information in this document.

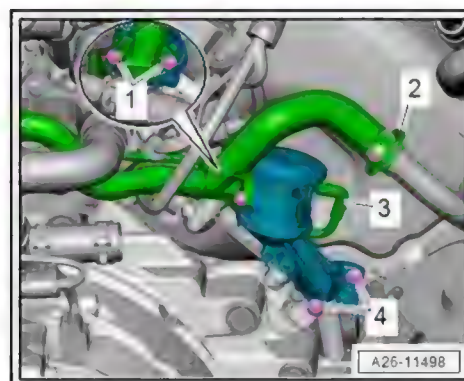


- Detach vacuum hose -3- from combination valve for secondary air system.
- Press release tabs on both sides and disconnect secondary air hose -2-.
- Remove bolts -4-, detach combination valve (right-side) for secondary air system and move valve to left side.

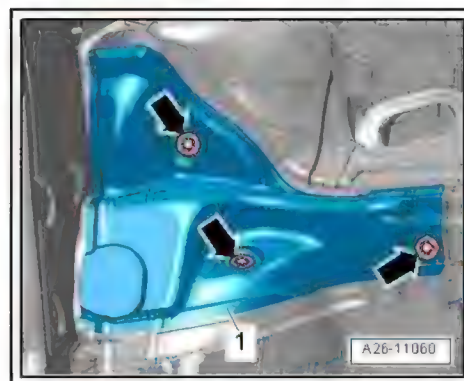


Note

Disregard -item 1-.



- Release fasteners -arrows- and detach heat shield -1- for tunnel (top right).



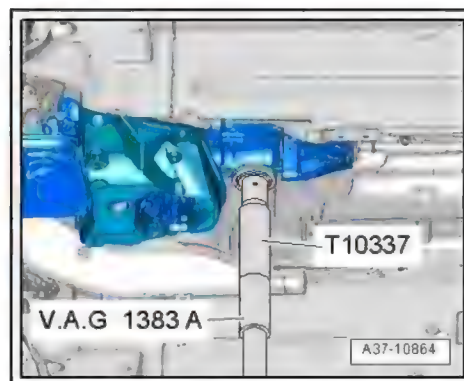
- Fit gearbox support - T10337- onto engine and gearbox jack and position underneath gearbox.
- Raise gearbox slightly using engine and gearbox jack.



#### WARNING

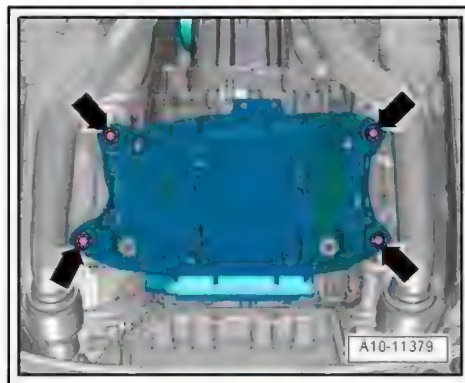
*Risk of accident.*

- ♦ *Engine and gearbox jack must remain in position when work is being carried out and must not be left unattended under the vehicle.*

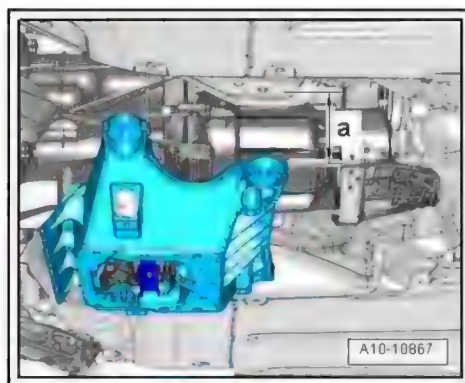




- Remove bolts -arrows- for tunnel cross member.



- Lower tunnel cross member as far as distance -a- using engine and gearbox jack - VAS 6931- .
- Dimension -a- = 60 mm (maximum).



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Secure gearbox in position using retaining tool - VW 785/1 B-, as shown in illustration.
- Lift off catalytic converter (right-side).

#### Installing

Installation is carried out in reverse order; note the following:



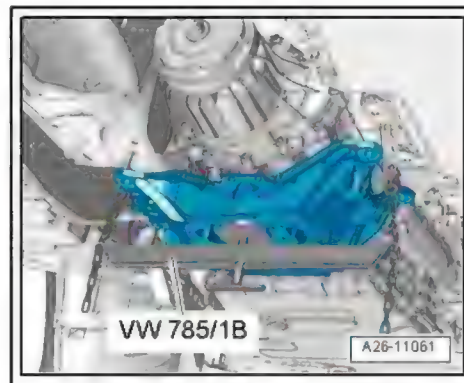
#### Note

*Renew gaskets and self-locking nuts after removal.*

- Install combination valve for secondary air (right-side)  
⇒ ["3.4.2 Removing and installing combination valve \(right-side\)", page 362](#) .
- Install Lambda probe after catalytic converter - G130-  
⇒ ["8.2.1 Removing and installing Lambda probe G39 / G130", page 330](#) .
- Install coolant pipe (right-side) on gearbox  
⇒ ["3.2.8 Removing and installing coolant pipe \(right-side\) on gearbox", page 220](#) .
- Install throttle valve module - J338-  
⇒ ["4.3 Removing and installing throttle valve module J338", page 301](#) .

#### Tightening torques

- ◆ ⇒ ["1.1 Exploded view - silencers", page 335](#)
- ◆ ⇒ [Fig. "Components of mountings for catalytic converter", page 344](#)
- ◆ Tunnel cross member ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; Assembly mountings; Exploded view - assembly mountings / ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; Assembly mountings; Exploded view - assembly mountings
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Strips / trim panels / extensions; Exploded view - heat shield
- ◆ Subframe cross brace ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Exploded view - subframe



### 3 Secondary air system

⇒ "3.1 Exploded view - secondary air system", page 354

⇒ "3.2 Removing and installing secondary air pump motor V101", page 356

⇒ "3.3 Checking combination valve", page 357

⇒ "3.4 Removing and installing combination valve", page 359

#### 3.1 Exploded view - secondary air system

Secondary air pump motor - V101-

1 - Secondary air pump motor - V101-

☐ Fitting location: At front left of engine compartment below longitudinal member

☐ Removing and installing  
⇒ "3.2 Removing and installing secondary air pump motor V101", page 356

☐ Check in **Guided Fault Finding** ⇒ Vehicle diagnostic tester

2 - Bolt

☐ 8 Nm

3 - Bonded rubber bush

4 - Bracket

☐ For secondary air pump motor - V101-

5 - Hose

☐ For secondary air

6 - O-ring

☐ Renew after removing

7 - Nut

☐ 9 Nm

8 - Pipe

☐ For secondary air

9 - Bolt

☐ 8 Nm

10 - Nut

☐ 9 Nm

11 - O-ring

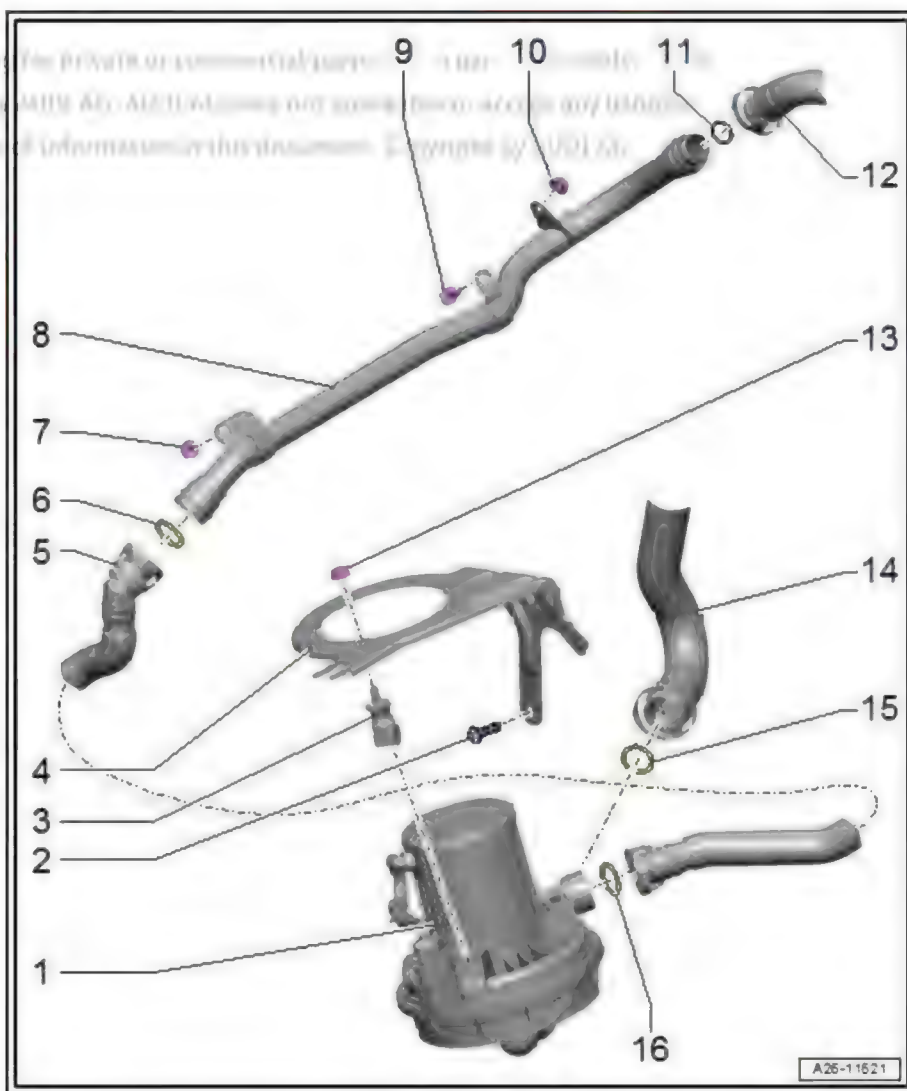
☐ Renew after removing

12 - Hose

☐ For secondary air

13 - Nut

☐ 9 Nm



14 - Hose

- ☐ For secondary air

15 - O-ring

- ☐ Renew after removing

16 - O-ring

- ☐ Renew after removing

Combination valves for secondary air system

1 - Gasket

- ☐ Renew after removing

2 - Combination valve for secondary air system (left-side)

- ☐ Check operation and check for leaks  
⇒ ["3.3 Checking combination valve", page 357](#)
- ☐ Removing and installing  
⇒ ["3.4.1 Removing and installing combination valve \(left-side\)", page 359](#)

3 - Seal

- ☐ Renew after removing

4 - Hose

- ☐ From secondary air pump motor - V101-

5 - Bolts

- ☐ 9 Nm

6 - Gasket

- ☐ Renew after removing

7 - Vacuum hose

8 - Combination valve for secondary air system (right-side)

- ☐ Check operation and check for leaks  
⇒ ["3.3 Checking combination valve", page 357](#)
- ☐ Removing and installing  
⇒ ["3.4.2 Removing and installing combination valve \(right-side\)", page 362](#)

9 - Gasket

- ☐ Renew after removing

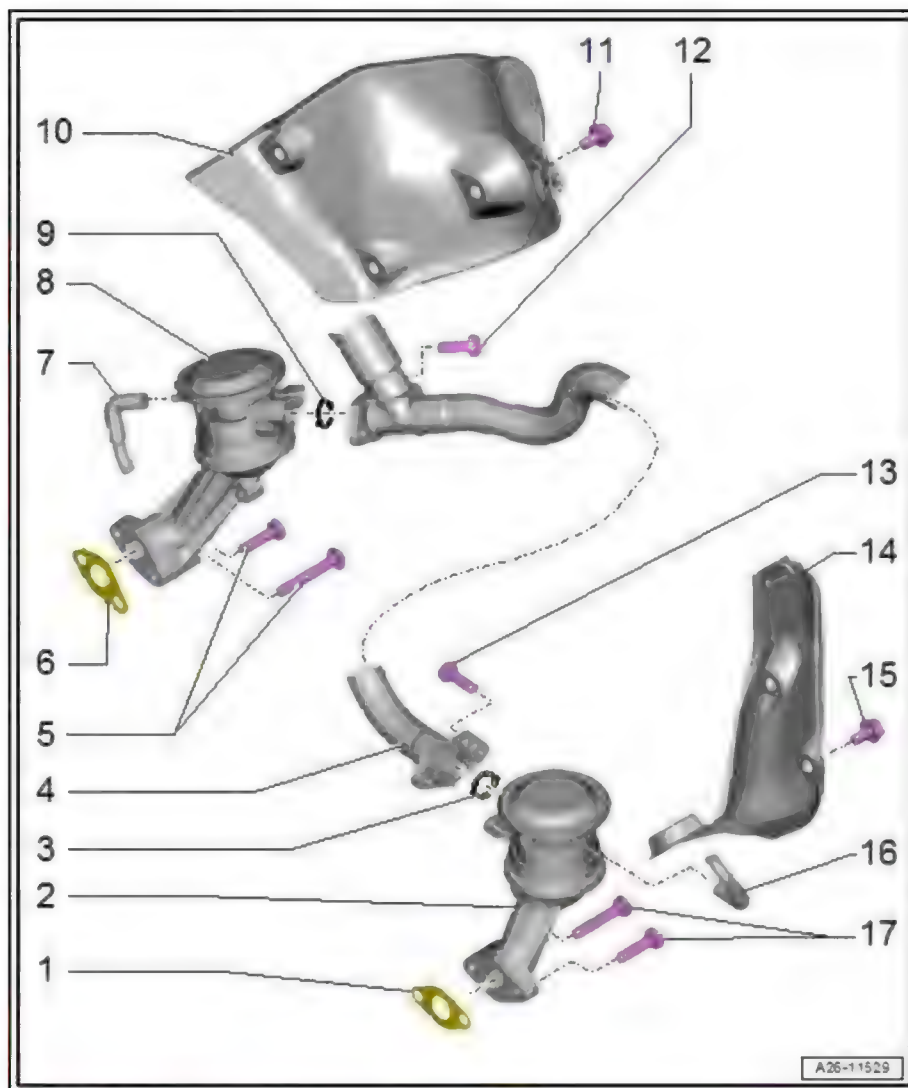
10 - Heat shield

11 - Bolt

- ☐ 9 Nm

12 - Bolt

- ☐ 9 Nm





13 - Bolt

□ 9 Nm

14 - Heat shield

15 - Bolt

□ 9 Nm

16 - Vacuum hose

17 - Bolts

□ 9 Nm

## 3.2 Removing and installing secondary air pump motor - V101-

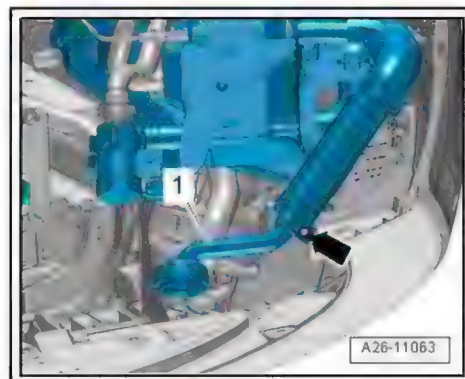
### Removing



#### Note

*Re-install all cable ties in the same locations when installing.*

- Remove wheel spoiler (front right) ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front) .
- Vehicles with auxiliary heater: Release clamp -arrow- and swivel exhaust pipe for auxiliary heater -1- to rear.
- Remove air intake grille (right-side) from bottom section of bumper cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Bumper (front); Removing and installing attachments .



- Unplug electrical connector -4- at secondary air pump motor - V101- .
- Press release tabs and detach secondary air hoses -1- and -2-.
- Remove nuts -3- and detach secondary air pump.

#### Installing

Installation is carried out in reverse order; note the following:



Note

*Renew O-rings after removing.*

- Install tailpipe for auxiliary heater ⇒ Auxiliary heater, supplementary heater; Rep. gr. 82 ; Auxiliary/supplementary heater; Removing and installing exhaust system .

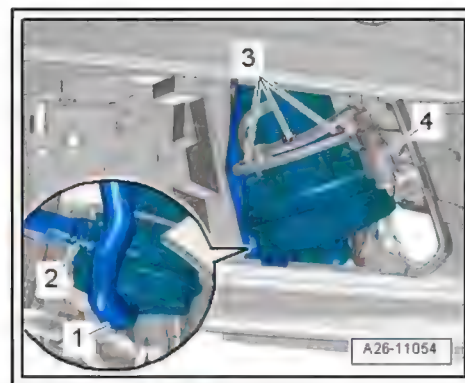
#### Tightening torques

- ◆ ⇒ ["3.1 Exploded view - secondary air system", page 354](#)
- ◆ Wheel spoiler ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front)

### 3.3 Checking combination valve

Special tools and workshop equipment required

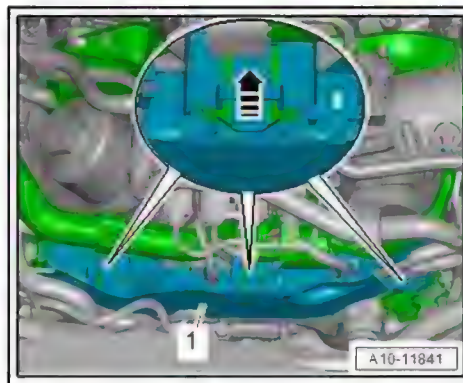
- ◆ Hand vacuum pump - VAS 6213-



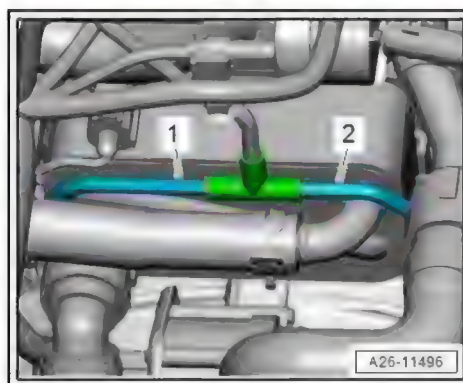
#### Procedure

- Vacuum hoses and hose connections do not leak.
- Vacuum hoses are not clogged.
- Remove throttle valve module - J338-  
⇒ ["4.3 Removing and installing throttle valve module J338 ", page 301 .](#)

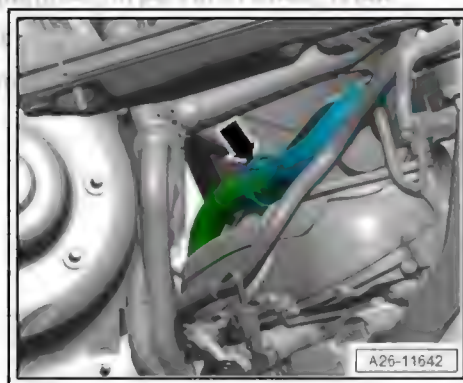
- Release fasteners -arrow- and press wiring duct -1- towards rear.



- Detach vacuum hose -1- or -2- from combination valve to be checked.
- Connect hand vacuum pump - VAS 6213- to vacuum hose of combination valve to be checked.



- Press release tabs and detach secondary air hose -arrow- from secondary air pump motor - V101-.
- Extend secondary air hose with a test hose and blow lightly into secondary air hose with your mouth (do not use compressed air).
  - The combination valves for secondary air should be closed; it should not be possible to blow through the hose.
- Operate hand vacuum pump.
  - The combination valve should open; it should now be possible to blow through the hose.



#### Note

*It is necessary to overcome slight initial resistance before it is possible to blow through the hose.*

- Renew combination valve for secondary air system if it does not open  
⇒ ["3.4 Removing and installing combination valve", page 359](#).

#### Assembling

Assembly is carried out in reverse sequence; note the following:



#### Note

*Renew O-ring after removal.*

- Install throttle valve module - J338-  
⇒ ["4.3 Removing and installing throttle valve module J338", page 301](#).

## 3.4 Removing and installing combination valve

⇒ "3.4.1 Removing and installing combination valve (left-side)",  
page 359

⇒ "3.4.2 Removing and installing combination valve (right-side)",  
page 362

### 3.4.1 Removing and installing combination valve (left-side)

Removing



Note

*Re-install all cable ties in the same locations when installing.*

- Remove front silencer (left-side)  
⇒ "1.3 Removing and installing front silencers", page 339 .
- Remove body brace ⇒ Running gear, axles, steering; Rep. gr. 40 ; Suspension strut, upper links; Removing and installing body brace .
- Remove wheel housing liner (front left) ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Removing and installing wheel housing liner (front) .
- Remove bolts -arrows- and detach heat shield (left-side) -1-.

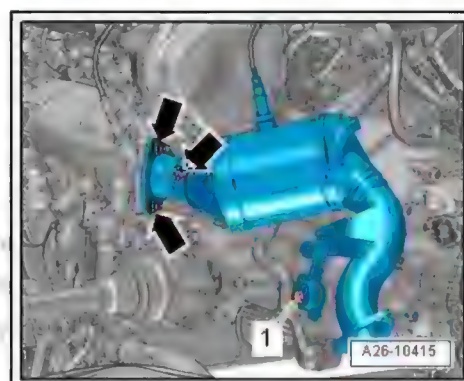
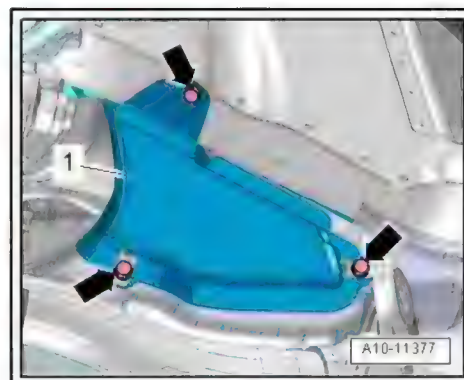


Caution

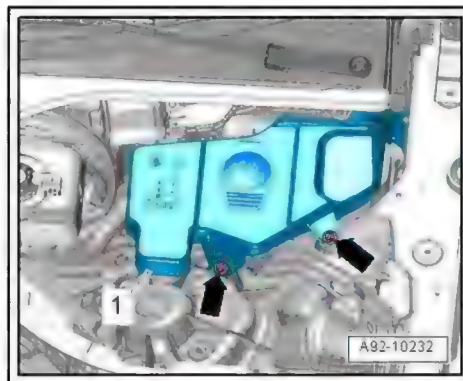
*Risk of irreparable damage to electronic components.*

♦ *Observe notes on procedure for disconnecting the battery.*

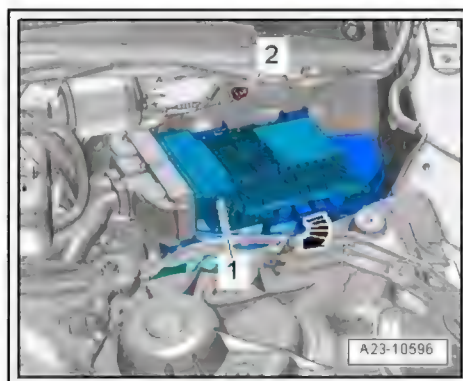
- Switch off ignition and remove ignition key.
- Disconnect earth wire from battery terminal ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .
- Move clear electrical wiring for Lambda probe 2 after catalytic converter - G131- .
- Remove bolt -1- and nuts -arrows-, detach catalytic converter (left-side) from exhaust manifold and move to rear.



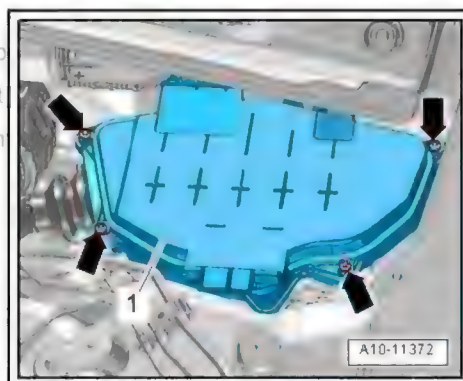
- Unscrew bolts -arrows- and pull filler neck -1- out of washer fluid reservoir and through opening in body to right side.



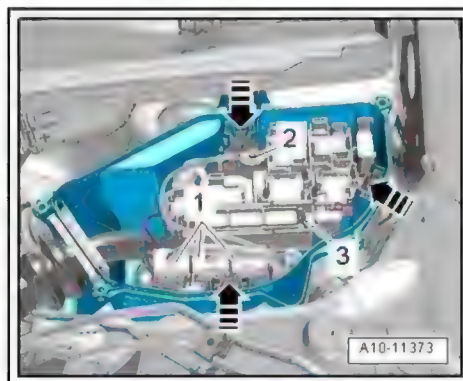
- Remove cap nut -2- and move earth wiring clear.
- Release fastener -arrow-, detach engine control unit - J623- item 1- from bracket and swivel it to one side.



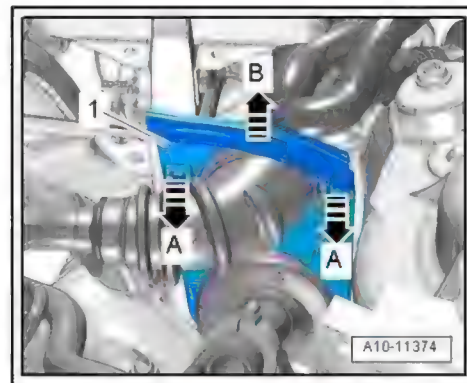
- Remove bolts -arrows- and detach cover -1- for electronics box in plenum chamber.
- Copyright. Copying for private or commercial purposes is not permitted unless authorised by AUDI AG. AUDI AG does not accept any liability with respect to the correctness of information in this document.



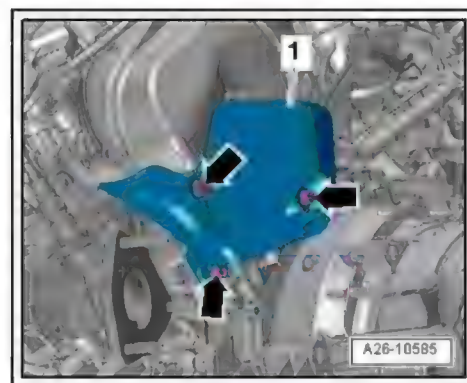
- Unplug electrical connectors -1- and unscrew nut -2- for electrical wiring.
- Release catches -arrows- and detach relay carrier with fuse holder -3-.
- Disengage engine wiring harness at electronics box in plenum chamber and move clear.



- Release catches -arrows A- and lift off wiring protector -1- -arrow B-.
- Move clear wiring harness and press to one side.



- Remove bolts -arrows- and detach heat shield -1-.



Printed by copyright Audi AG for private commercial purposes. Any reproduction or use is permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Remove bolts -3- for secondary air system hose.
- Detach vacuum hose -2- from combination valve for secondary air system.
- Unscrew bolts -1- and detach combination valve for secondary air system.

#### Installing

Installation is carried out in reverse order; note the following:



#### Note

*Renew gasket after removing.*

- Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Install engine control unit - J623-  
⇒ ["9.1 Removing and installing engine/motor control unit J623", page 334](#) .
- Install filler neck for washer fluid reservoir ⇒ Electrical system; Rep. gr. 92 ; Windscreen washer system; Exploded view - windscreen washer system .
- Install catalytic converter (left-side)  
⇒ ["2.2.1 Removing and installing catalytic converter \(left-side\)", page 344](#) .
- Observe steps required after re-connecting battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .

#### Tightening torques

- ◆ ⇒ ["3.1 Exploded view - secondary air system", page 354](#)
- ◆ ⇒ Electrical system; Rep. gr. 97 ; Relay carriers, fuse carriers, electronics boxes; Overview of fitting locations - relay carriers, fuse carriers, electronics boxes
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Strips / trim panels / extensions; Exploded view - heat shield
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front)
- ◆ Body brace ⇒ Running gear, axles, steering; Rep. gr. 40 ; Suspension strut, upper links; Exploded view - suspension strut, upper links

### 3.4.2 Removing and installing combination valve (right-side)

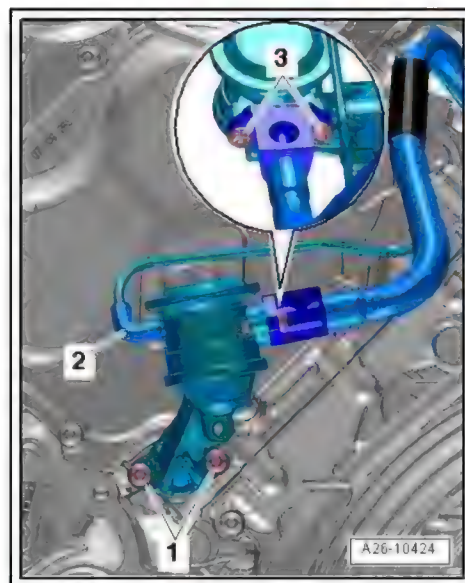
#### Removing



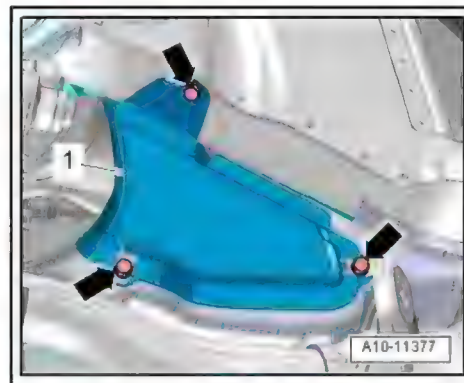
#### Note

*Re-install all cable ties in the same locations when installing.*

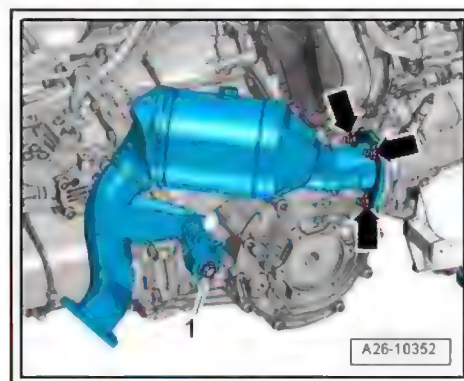
- Remove front silencer (right-side)  
⇒ ["1.3 Removing and installing front silencers", page 339](#) .
- Remove wheel housing liner (front right) ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Removing and installing wheel housing liner (front) .



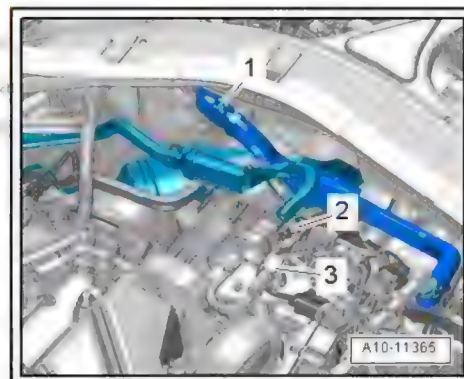
- Remove bolts -arrows- and detach heat shield (right-side) -1-.



- Move clear electrical wiring for Lambda probe 2 after catalytic converter - G131- .
- Remove bolt -1- and nuts -arrows-, detach catalytic converter (right-side) from exhaust manifold and move to rear.
- Remove throttle valve module - J338-  
⇒ ["4.3 Removing and installing throttle valve module J338 "](#), [page 301](#) .



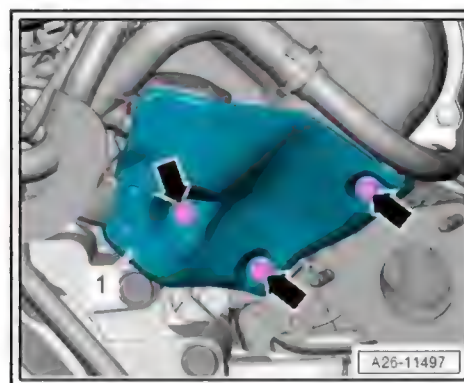
- Unplug electrical connector -2- at activated charcoal filter solenoid valve 1 - N80- and detach vacuum hose -3- (press release tabs).
- Detach activated charcoal filter solenoid valve 1 - N80- from bracket and move it clear to the side with hoses still attached.



Note

*Disregard -item 1-.*

- Remove bolts -arrows- and detach heat shield -1-.



- Detach vacuum hose -3- from combination valve for secondary air system.
- Press release tabs on both sides and disconnect secondary air hose -2-.
- Remove bolts -4- and detach combination valve (right-side) for secondary air system and bolts -1- for secondary air hose.

#### Installing

Installation is carried out in reverse order; note the following:



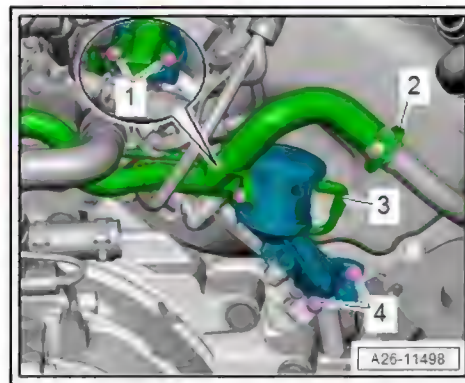
#### Note

*Renew gasket after removing.*

- Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Install throttle valve module - J338-  
⇒ ["4.3 Removing and installing throttle valve module J338"](#), [page 301](#).
- Install catalytic converter (right-side)  
⇒ ["2.2.2 Removing and installing catalytic converter \(right-side\)"](#), [page 348](#).

#### Tightening torques

- ◆ ⇒ ["3.1 Exploded view - secondary air system"](#), [page 354](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Strips / trim panels / extensions; Exploded view - heat shield
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front)



## 4 Exhaust manifolds

⇒ ["4.1 Exploded view - exhaust manifold", page 365](#)

⇒ ["4.2 Removing and installing exhaust manifold", page 366](#)

### 4.1 Exploded view - exhaust manifold

#### 1 - Nut

- ☐ Renew **after** removing
- ☐ Coat thread with high-temperature paste; for high-temperature paste refer to ⇒ [Electronic parts catalogue](#)
- ☐ Tightening torque and tightening sequence:  
left-side  
⇒ [Fig. "Exhaust manifold \(left-side\) - tightening torque and sequence", page 366](#) ;  
right-side  
⇒ [Fig. "Exhaust manifold \(right-side\) - tightening torque and sequence", page 366](#)

#### 2 - Bracket

- ☐ For heat shield

#### 3 - Exhaust manifold

- ☐ Removing and installing  
⇒ ["4.2 Removing and installing exhaust manifold", page 366](#)

#### 4 - Gasket

- ☐ Renew after removing

#### 5 - Bolt

- ☐ 9 Nm

#### 6 - Heat shield

#### 7 - Washer

#### 8 - Bolt

- ☐ 9 Nm

#### 9 - Lambda probe

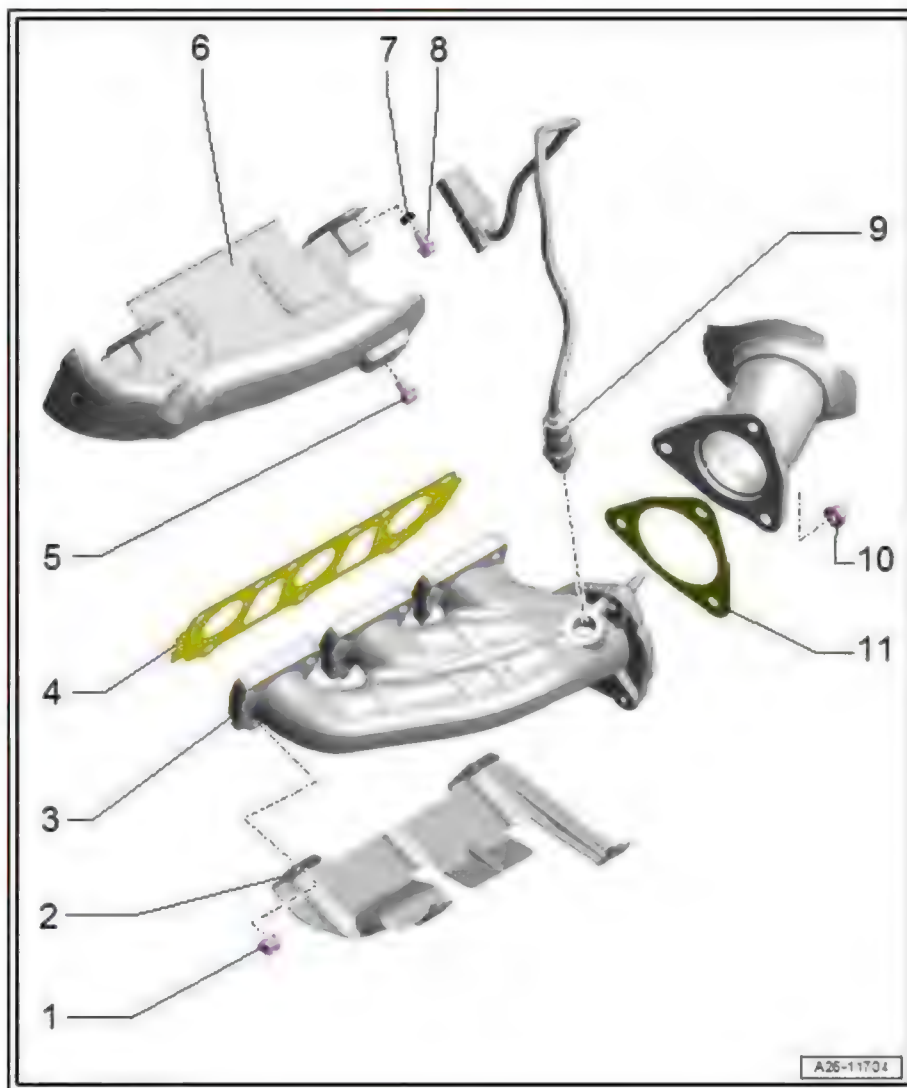
- ☐ Before catalytic converter
- ☐ Removing and installing ⇒ ["8.2.1 Removing and installing Lambda probe G39 / G130", page 330](#)

#### 10 - Nut

- ☐ Renew after removing
- ☐ Coat thread with high-temperature paste; for high-temperature paste refer to ⇒ [Electronic parts catalogue](#)
- ☐ 23 Nm

#### 11 - Gasket

- ☐ Renew after removing
- This document is for private use only. It is not to be used for commercial purposes. All rights reserved. Audi AG is not responsible for any damage or loss of data. The content of this document is subject to change without notice. Copyright by AUDI AG.



## Exhaust manifold (left-side) - tightening torque and sequence

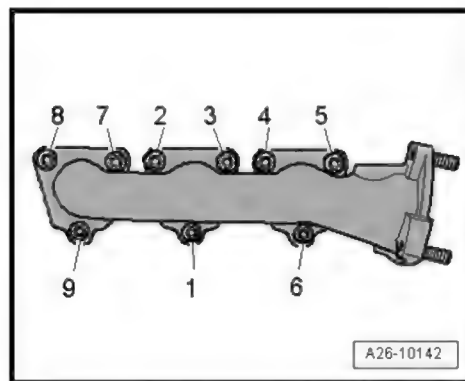


### Note

- ◆ *Renew nuts after removing.*
- ◆ *Coat threads of nuts with high-temperature paste; for high temperature paste refer to ⇒ [Electronic parts catalogue](#) .*

– Tighten nuts in stages in the sequence shown:

Stage	Nuts	Tightening torque
1.	-1 ... 9-	Screw in by hand until contact is made
2.	-1 ... 9-	15 Nm
3.	-1 ... 9-	25 Nm



## Exhaust manifold (right-side) - tightening torque and sequence

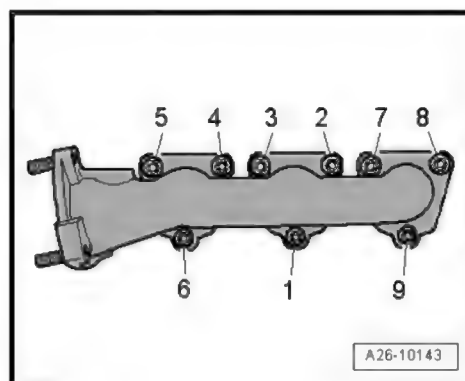


### Note

- ◆ *Renew nuts after removing.*
- ◆ *Coat threads of nuts with high-temperature paste; for high temperature paste refer to ⇒ [Electronic parts catalogue](#) .*

– Tighten nuts in stages in the sequence shown:

Stage	Nuts	Tightening torque
1.	-1 ... 9-	Screw in by hand until contact is made
2.	-1 ... 9-	15 Nm
3.	-1 ... 9-	25 Nm



## 4.2 Removing and installing exhaust manifold

⇒ ["4.2.1 Removing and installing exhaust manifold \(left-side\)", page 366](#)

⇒ ["4.2.2 Removing and installing exhaust manifold \(right-side\)", page 370](#)

### 4.2.1 Removing and installing exhaust manifold (left-side)

#### Removing

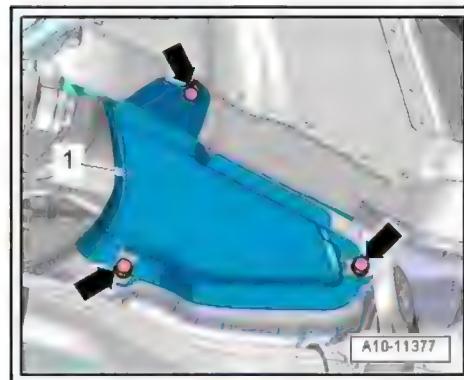


### Note

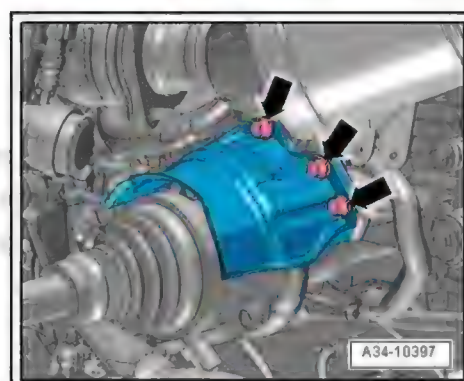
*Re-install all cable ties in the same locations when installing.*

- Remove noise insulation panels ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Detach poly V-belt from air conditioner compressor  
⇒ ["1.2.2 Removing and installing poly V-belt for ancillaries", page 48](#) .

- Remove air conditioner compressor ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Detaching and attaching air conditioner compressor at bracket .
- Remove bolts -arrows- and detach heat shield -1-.



- Remove bolts -arrows- and detach heat shield for drive shaft (left-side).
- Unbolt drive shaft (left-side) from gearbox flange shaft ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft



#### Caution

*Risk of damage to flexible joints in front silencer.*

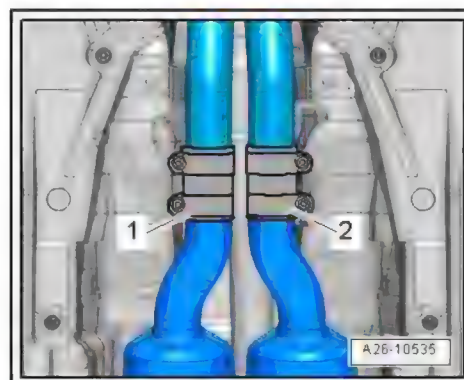
- ◆ *Do NOT bend the flexible joint in the front silencer more than 10°.*

- Loosen and push back clamp -1- and tie up front silencer (left-side).

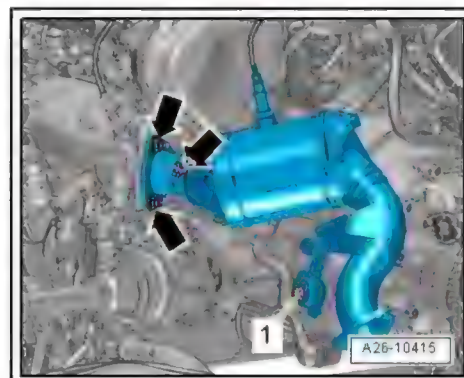


#### Note

*Disregard -item 2-.*



- Remove bolt -1- and nuts -arrows- and push catalytic converter (left-side) towards rear of vehicle.

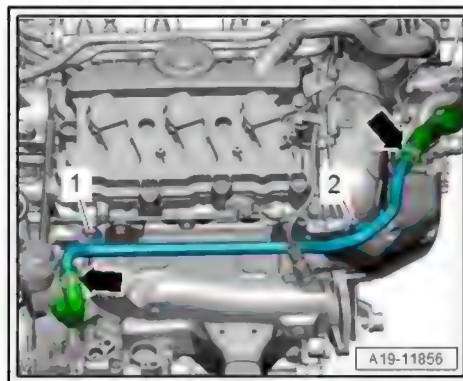


- Remove bolt -1- and nut -2- and push coolant pipe (left-side) clear to side.



Note

Disregard -arrows-.

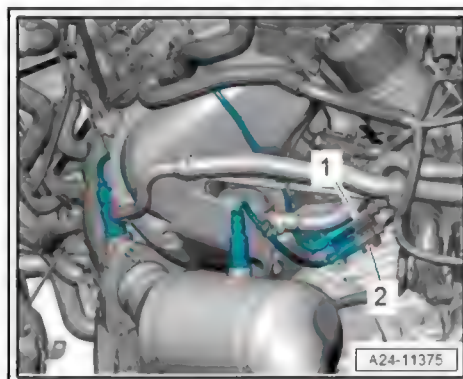


- Take electrical connector -1- for Lambda probe 2 - G108- out of bracket, unplug and move wiring clear.

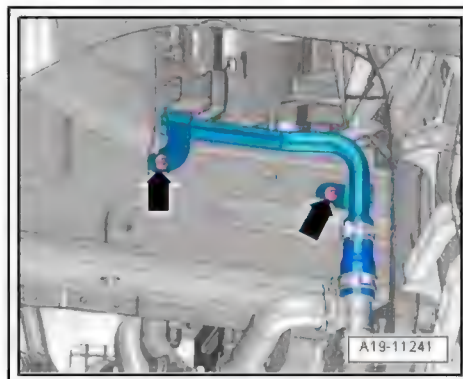


Note

Disregard -item 2-.



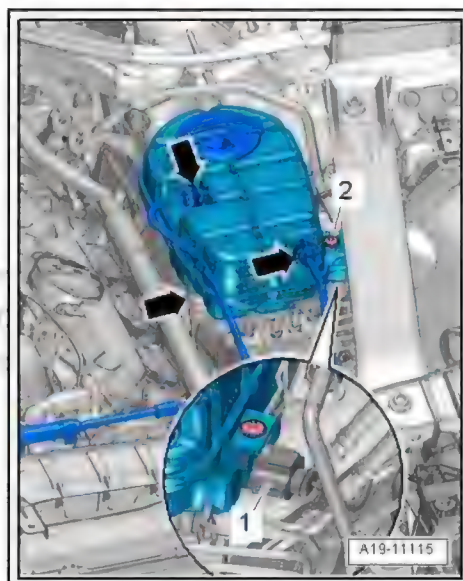
- Unscrew nuts -arrows- and move clear coolant pipe on longitudinal member.



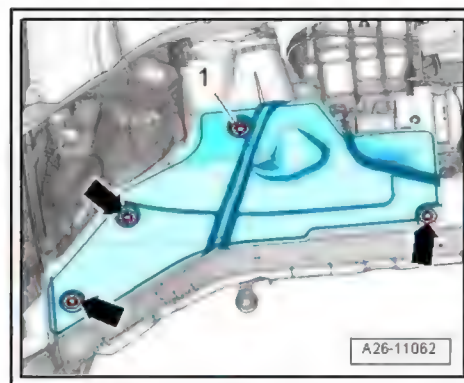
- Unplug electrical connector -1-.
- Remove bolt -2- and push coolant expansion tank to side with coolant hoses -arrows- connected.



Produced by AUDI AG. Copying for private use is permitted. All other copying is prohibited by AUDI AG. All rights reserved. For the correct use of information, see the user manual.



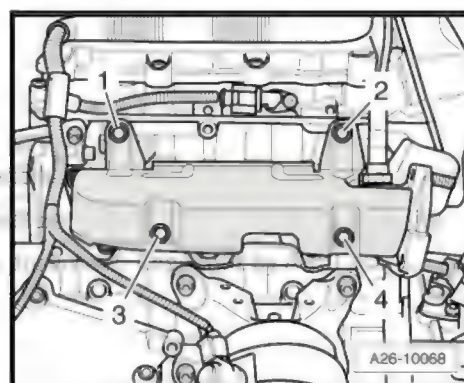
- Release fasteners -1- and -arrows- and detach heat shield from longitudinal member (left-side).



- Remove bolts -1... 4- and detach heat shield.



Document by Volkswagen Copyright for private use only  
 (document is not to be reproduced by Audi AG, Audi) or  
 with regard to the content (reproduction, distribution, etc.)



- Remove nuts -1- and -8- and detach bracket for heat shield.
- Remove nuts -2 ... 7- and -9- and detach exhaust manifold.

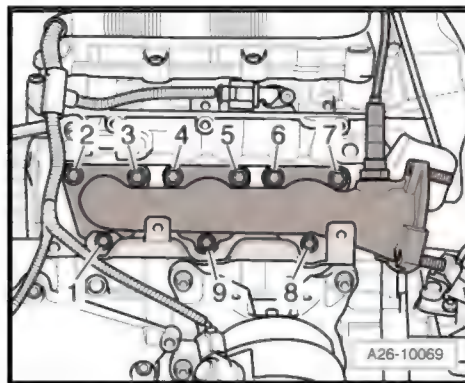
#### Installing

Installation is carried out in reverse order; note the following:



#### Note

- ◆ *Renew gasket and self-locking nuts after removal.*
- ◆ *Coat threads of nuts with high-temperature paste; for high temperature paste refer to ⇒ [Electronic parts catalogue](#) .*
- Fit exhaust manifold with gasket for catalytic converter and tighten nuts  
⇒ [Fig. "Exhaust manifold \(left-side\) - tightening torque and sequence"](#) , page 366 .
- Electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Install catalytic converter (left-side)  
⇒ ["2.2.1 Removing and installing catalytic converter \(left-side\)"](#) , page 344 .
- Install poly V-belt  
⇒ ["1.2.2 Removing and installing poly V-belt for ancillaries"](#) , page 48 .



#### Tightening torques

- ◆ ⇒ [Fig. "Exhaust manifold \(left-side\) - tightening torque and sequence"](#) , page 366
- ◆ ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Exploded view - drive shaft
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Strips / trim panels / extensions; Exploded view - heat shield
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation
- ◆ ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Exploded view - air conditioner compressor drive unit

### 4.2.2 Removing and installing exhaust manifold (right-side)

#### Removing

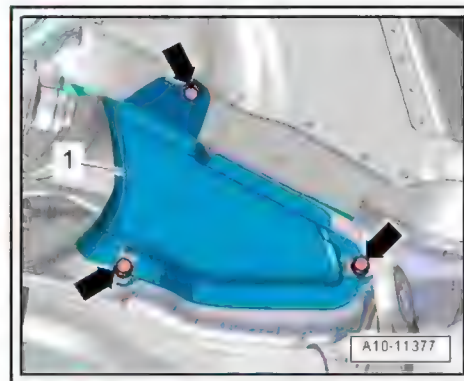


#### Note

*Re-install all cable ties in the same locations when installing.*

- Drain coolant  
⇒ ["1.3 Draining and filling cooling system"](#) , page 183 .
- Also remove noise insulation (rear) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .

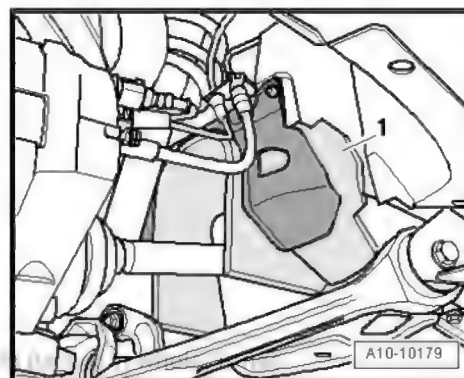
- Remove air cleaner housing  
⇒ [“3.2 Removing and installing air cleaner housing”](#),  
[page 292](#) .
- Remove Lambda probe - G39-  
⇒ [“8.2.1 Removing and installing Lambda probe G39 / G130”](#),  
[page 330](#) .
- Remove bolts -arrows- and detach heat shield (right-side)  
-1-.



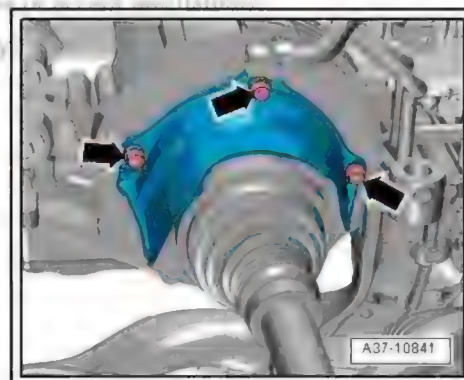
- Remove front wheel (right-side) ⇒ Running gear, axles, steering;  
Rep. gr. 44 ; Wheels, tyres .
- Remove cover -1- for drive shaft in wheel housing (right-side).



Protected by copyright. Copying for private or commercial purposes is prohibited.



- Remove bolts -arrows- and detach heat shield for drive shaft  
(right-side).
- Unbolt drive shaft (right-side) from gearbox flange shaft ⇒  
Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing  
and installing drive shaft .





### Caution

*Risk of damage to flexible joints in front silencer.*

- ◆ *Do NOT bend the flexible joint in the front silencer more than 10°.*

- Loosen and push back clamp -2- and tie up front silencer (right-side).



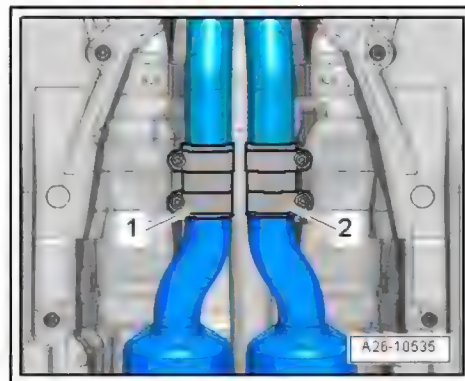
### Note

*Disregard -item 1-.*

Protected by copyright. Copying for private or

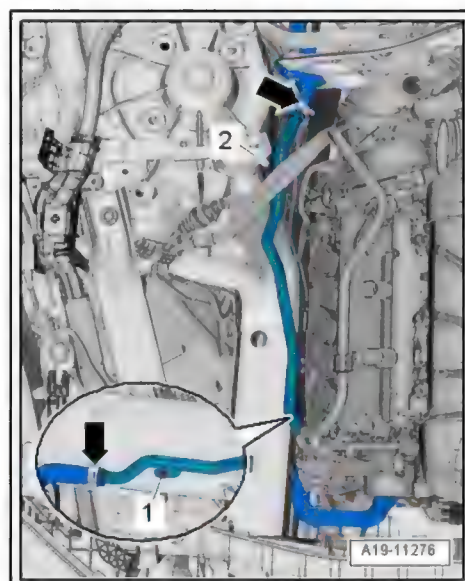
permitted unless authorized by Audi AG. Audi AG does not guarantee or accept any liability

with respect to the correctness of information in this document. Copyright © AUDI AG.



### Vehicles without auxiliary heater:

- Remove bolts -1, 2-.
- Release hose clips -arrows-, disconnect coolant hoses from coolant pipe at longitudinal member (right-side) and detach coolant pipe.



### Vehicles with auxiliary heater:

- Loosen nut -1- and remove bolt -2-.
- Release hose clips -arrows-, disconnect coolant hoses from coolant pipe at longitudinal member (right-side) and detach coolant pipe.



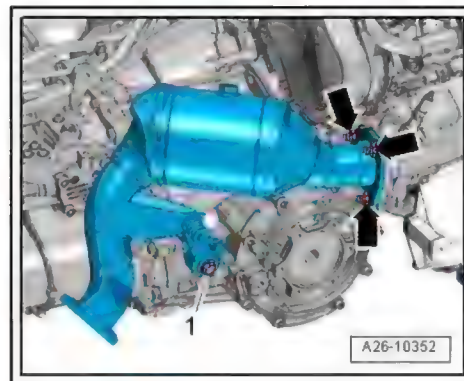
All vehicles (continued):

- Remove bolt -1- and nuts -arrows- and pull catalytic converter off exhaust manifold.

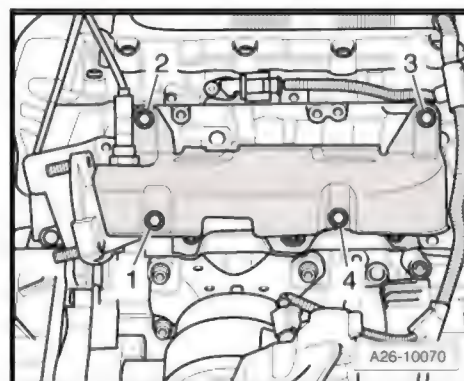


Note

*For illustration purposes, the installation position is shown with the engine removed.*



- Remove bolts -1 ... 4- and detach heat shield.



Produced by audi GmbH. Copying for private or commercial purposes is part forbidden & not  
 authorized without permission by AUDI AG. AUDI AG does not guarantee or accept any liability  
 whatsoever for the correctness of information in this document. Copyright by AUDI AG.

- Remove nuts -7- and -9- and detach bracket for heat shield.
- Remove nuts -1 ... 6- and -8- and detach exhaust manifold.

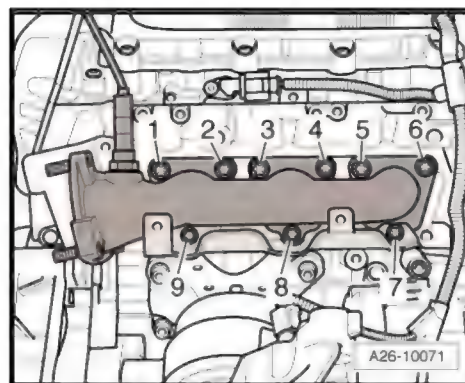
#### Installing

Installation is carried out in reverse order; note the following:



#### Note

- ◆ *Renew gaskets and self-locking nuts after removal.*
- ◆ *Coat threads of nuts with high-temperature paste; for high temperature paste refer to ⇒ [Electronic parts catalogue](#) .*
- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ [Electronic parts catalogue](#) .*
- Fit exhaust manifold with gasket for catalytic converter and tighten nuts  
⇒ [Fig. "Exhaust manifold \(right-side\) - tightening torque and sequence"](#) , page 366 .
- Install catalytic converter (right-side)  
⇒ ["2.2.2 Removing and installing catalytic converter \(right-side\)"](#) , page 348 .
- Install Lambda probe - G39-  
⇒ ["8.2.1 Removing and installing Lambda probe G39 / G130"](#) , page 330 .
- Install air cleaner housing  
⇒ ["3.2 Removing and installing air cleaner housing"](#) , page 292 .



#### Note

*Do not reuse coolant.*

- Fill up with coolant ⇒ [page 185](#) .

#### Tightening torques

- ◆ ⇒ [Fig. "Exhaust manifold \(right-side\) - tightening torque and sequence"](#) , page 366
- ◆ ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Exploded view - drive shaft
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Strips / trim panels / extensions; Exploded view - heat shield
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Exploded view - wheel housing liner (front)
- ◆ ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

## 28 – Ignition system

### 1 Ignition system

⇒ "1.1 Exploded view - ignition system", page 375

⇒ "1.2 Test data, spark plugs", page 376

⇒ "1.3 Removing and installing ignition coils with output stages",  
page 376

⇒ "1.4 Removing and installing knock sensor", page 379

⇒ "1.5 Removing and installing Hall senders", page 379

⇒ "1.6 Removing and installing engine speed sender G28", page  
380

#### 1.1 Exploded view - ignition system

##### 1 - Bolt

- 9 Nm

##### 2 - Hall sender

- Cylinder bank 1 (right-side)

◆ Inlet side: Hall sender - G40-

◆ Exhaust side: Hall sender 3 - G300-

- Removing and installing  
⇒ "1.5 Removing and installing Hall senders",  
page 379

##### 3 - O-ring

- Renew after removing

##### 4 - Knock sensor

- Contact surfaces between knock sensor and cylinder block must be free of corrosion, oil and grease

◆ Cylinder bank 1 (right-side): knock sensor 1 - G61-

◆ Cylinder bank 2 (left-side): knock sensor 2 - G66-

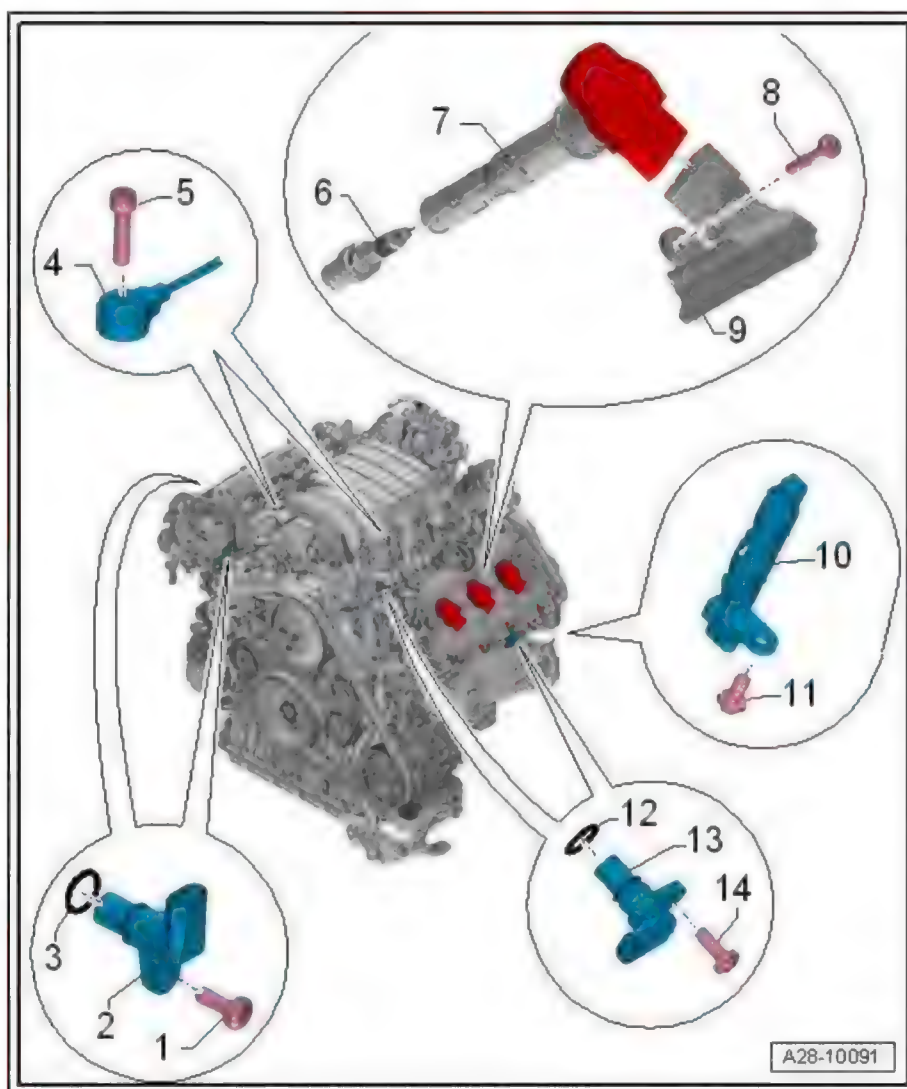
- Removing and installing  
⇒ "1.4 Removing and installing knock sensor",  
page 379

##### 5 - Bolt

- 25 Nm

##### 6 - Spark plug

- Remove and install with spark plug socket and extension - 3122 B- ⇒ Maintenance ; Booklet 411
- Tightening torque ⇒ Maintenance ; Booklet 411
- Change interval ⇒ Maintenance tables



**7 - Ignition coil with output stage**

- ☐ Ignition coil 1 with output stage - N70-
- ☐ Ignition coil 2 with output stage - N127-
- ☐ Ignition coil 3 with output stage - N291-
- ☐ Ignition coil 4 with output stage - N292-
- ☐ Ignition coil 5 with output stage - N323-
- ☐ Ignition coil 6 with output stage - N324-
- ☐ Removing and installing ⇒ ["1.3 Removing and installing ignition coils with output stages", page 376](#)

**8 - Bolt**

- ☐ 5 Nm

**9 - Electrical wiring harness****10 - Engine speed sender - G28-**

- ☐ Removing and installing ⇒ ["1.6 Removing and installing engine speed sender G28 ", page 380](#)

**11 - Bolt**

- ☐ 9 Nm

**12 - O-ring**

- ☐ Renew after removing

**13 - Hall sender**

- ☐ Cylinder bank 2 (left-side)

**◆ Inlet side: Hall sender 2 - G163-****◆ Exhaust side: Hall sender 4 - G301-**

- ☐ Removing and installing ⇒ ["1.5 Removing and installing Hall senders", page 379](#)

**14 - Bolt**

- ☐ 9 Nm

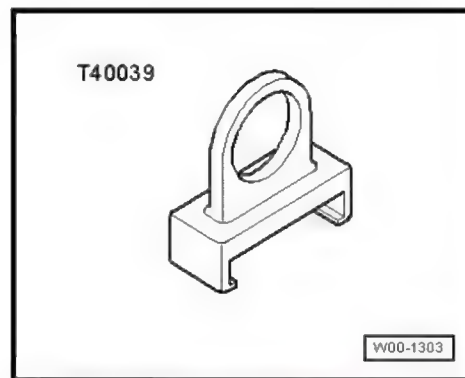
**1.2 Test data, spark plugs**

3.0 ltr. TFSI engine		
Idling speed	Cannot be adjusted; regulated by idling speed stabilisation	
Ignition timing	Not adjustable (determined by control unit)	
Ignition system	Multi-coil system with 6 ignition coils (output stages integrated) connected directly to spark plugs via spark plug connectors	
Spark plugs	Designations	⇒ Electronic parts catalogue
	Tightening torque	⇒ Maintenance ; Booklet 411
Firing order	1-4-3-6-2-5	

**1.3 Removing and installing ignition coils with output stages**

Special tools and workshop equipment required

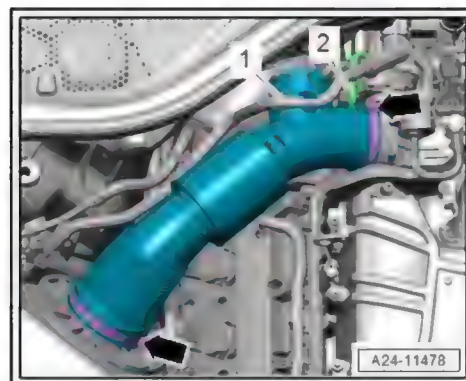
◆ Puller - T40039-



Removing

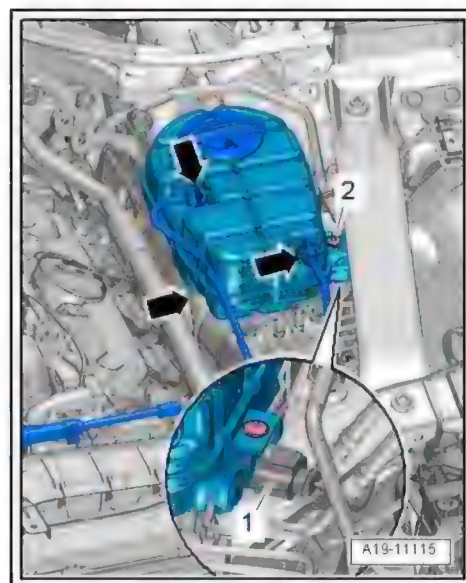
Cylinder bank 1 (right-side):

- Remove engine cover panel  
⇒ "3.1 Removing and installing engine cover panel",  
page 43 .
- Move hose -1- for activated charcoal filter system clear at air pipe.
- Detach vacuum hose -2- from connection on air pipe.
- Loosen hose clips -arrows- and detach air pipe.



Cylinder bank 2 (left-side):

- Unplug electrical connector -1-.
- Remove bolt -2- and push coolant expansion tank to side with coolant hoses -arrows- connected.



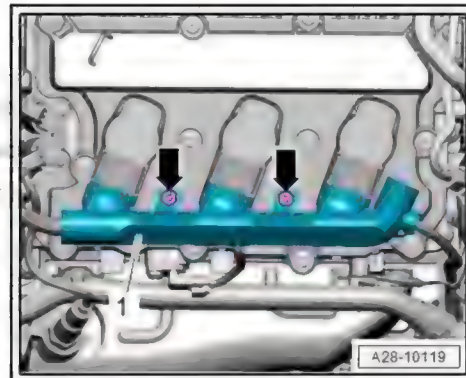
Both sides (continued):

- Unscrew bolts -arrows- and unplug electrical connectors at ignition coils.
- Move electrical wiring harness -1- down slightly.



Note

Illustration shows the installation position for cylinder bank 2 (left-side) as an example.

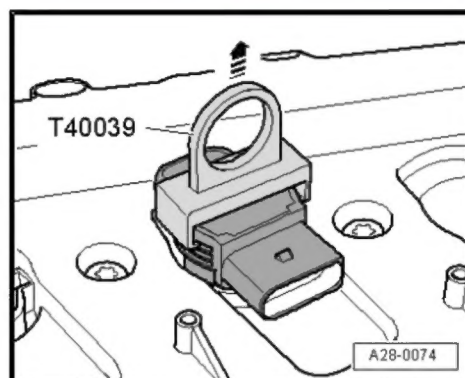
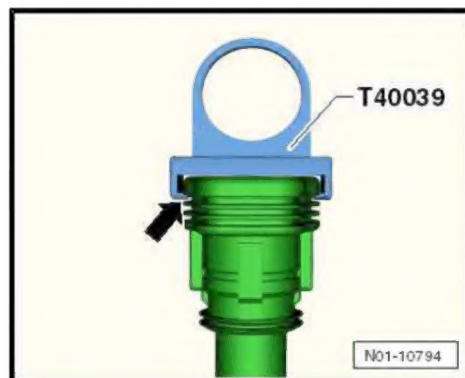




### Note

- ◆ To remove ignition coils, fit puller - T40039- onto upper (thick) rib -arrow- of ignition coil with output stage.
- ◆ The lower ribs can be damaged if they are used.

- Pull out ignition coil -arrow-.



### Installing

Installation is carried out in reverse order; note the following:

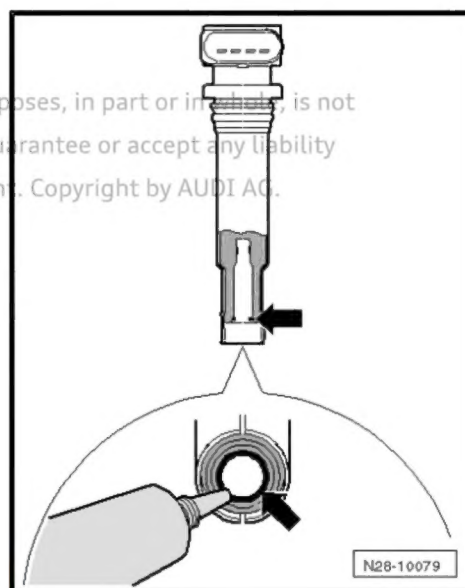
- Apply a thin bead of silicone paste all around end of sealing hose of ignition coil with output stage -arrow-.

Silicone paste ⇒ Electronic parts catalogue (ETKA).

- Align ignition coils with connectors and attach all connectors onto ignition coils simultaneously.
- Press ignition coils onto spark plugs by hand evenly (do not knock in with tools).
- Install engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#).

### Tightening torques

- ◆ ⇒ ["1.1 Exploded view - ignition system", page 375](#)
- ◆ ⇒ ["2.2 Exploded view - hose connections for charge air system", page 275](#)

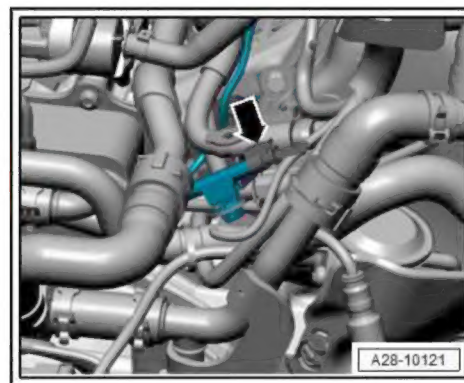


## 1.4 Removing and installing knock sensor

### Removing

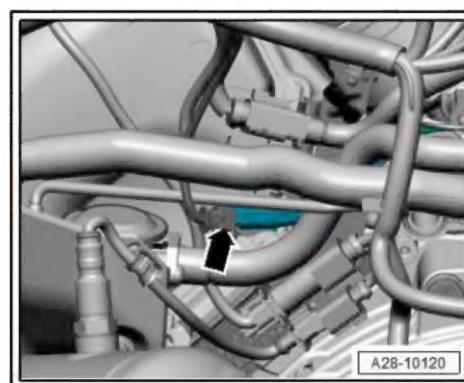
Knock sensor 1 - G61- , cylinder bank 1 (right-side):

- Remove FSI injector for cylinder 2  
⇒ ["5.3.2 Removing and installing injectors - vehicles with FSI engine", page 311](#) .
- Take electrical connector -arrow- out of bracket, unplug it and move electrical wiring clear.



Knock sensor 2 - G66- , cylinder bank 2 (left-side):

- Remove FSI injector for cylinder 5  
⇒ ["5.3.2 Removing and installing injectors - vehicles with FSI engine", page 311](#) .
- Remove plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Exploded view - plenum chamber partition panel .
- Take electrical connector -arrow- out of bracket, unplug it and move electrical wiring clear.



Both sides (continued):

- Remove bolt -1- for knock sensor 1 - G61- or bolt -2- for knock sensor 2 - G66- and detach knock sensor.

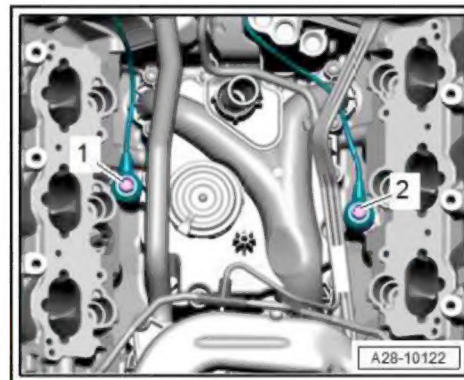
### Installing

Installation is carried out in reverse order; note the following:

- Install FSI injector  
⇒ ["5.3.2 Removing and installing injectors - vehicles with FSI engine", page 311](#) .

### Tightening torques

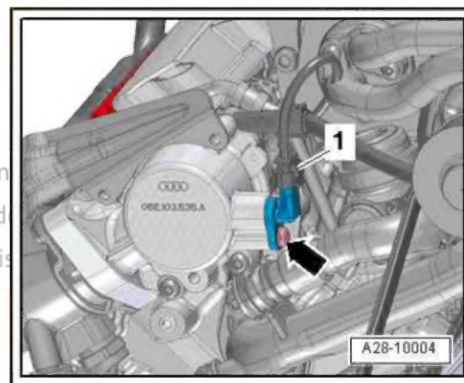
- ◆ ⇒ ["1.1 Exploded view - ignition system", page 375](#)



## 1.5 Removing and installing Hall senders

### Removing

- Remove engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#) .
- Unplug electrical connector -1- (cylinder bank 1)
- Unscrew bolt -arrow- and remove Hall sender - G40-





- Unplug electrical connector -1- (cylinder bank 2).
- Remove bolt -arrow- and detach Hall sender 2 - G163- .

#### Installing

Installation is carried out in reverse order; note the following:



#### Note

*Renew O-rings after removing.*

- Install engine cover panel  
⇒ ["3.1 Removing and installing engine cover panel", page 43](#) .

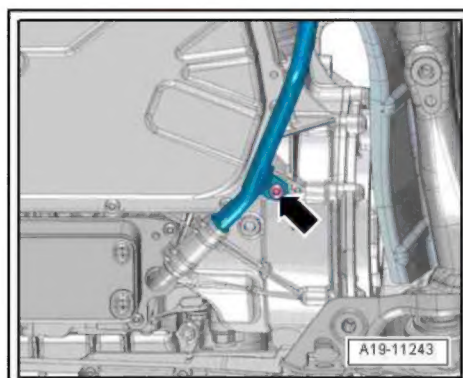
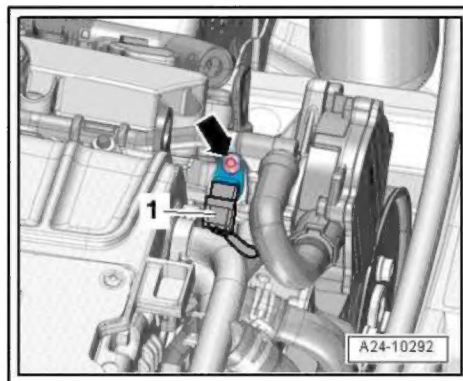
#### Tightening torques

- ◆ ⇒ ["1.1 Exploded view - ignition system", page 375](#)

## 1.6 Removing and installing engine speed sender - G28-

### Removing

- Remove noise insulation (rear) ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Remove bolt -arrow- for coolant pipe on gearbox (right-side).

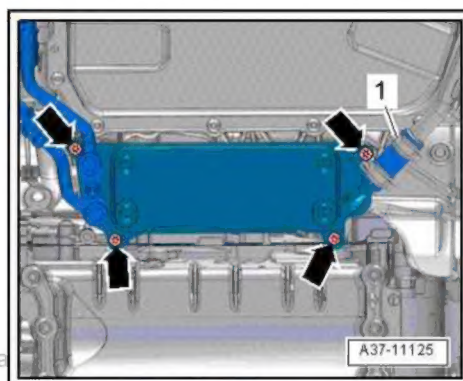


- Remove bolts -arrows- and push ATF cooler slightly to one side.



#### Note

*Disregard -item 1-.*



Protected by copyright. Copying for private or commercial use is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Unplug electrical connector -2-.
- Unscrew bolt -1- and pull out engine speed sender - G28- .

#### Installing

Installation is carried out in reverse order; note the following:

- Install ATF cooler ⇒ 7-speed dual clutch gearbox; Rep. gr. 34 ; ATF circuit; Exploded view - ATF circuit / ⇒ 8-speed automatic gearbox; Rep. gr. 37 ; ATF circuit; Exploded view - ATF circuit .

- Install coolant pipe (right-side) on gearbox

⇒ ["3.2.8 Removing and installing coolant pipe \(right-side\) on gearbox", page 220](#)

#### Tightening torques

- ◆ ⇒ ["1.1 Exploded view - ignition system", page 375](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Exploded view - noise insulation

